Academic versus Practical Experience as Relative Determinants of Judgment Performance and Confidence

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Revised: April 6, 2004

Key Words: Audit judgment, experience, confidence, banking, loan collectibility.

Data Availability: Contact the author concerning availability of the data.
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Abstract

Auditors evaluate the collectibility of commercial loans when they conduct financial audits of financial institutions. This judgment task is complex and cognitively demanding—task-specific knowledge is essential. Task-specific academic instruction and "classroom experience" provide for acquisition of relevant credit analysis knowledge; training of auditors and practical experience also are intended to provide relevant knowledge—but the relative benefits of academic instruction and experience versus training and practical experience remain unclear and worthy of research (e.g., Bonner and Walker 1994; Hammond 1996). First, to test for any benefit of academic task instruction and experience, loan judgments made by second-year graduate business students completing an elective course in credit analysis are compared with judgments made by audit seniors with similar business experience but without any credit analysis training or experience. The graduate students' judgments are significantly more appropriate and less biased, with less variance, given the criterion of the mean judgment of highly experienced financial institution audit partners. Second, as a test of the benefits of academic instruction and experience versus CPA firm training and practical experience, the judgments of the graduate students are compared with judgments provided by experienced audit managers: comparable levels of judgment performance are indicated for both groups. Third, to test for any incremental benefit of additional (and considerable) task-specific experience, comparisons are made of loan judgments made by the graduate students with those of senior managers/junior partners. The senior managers/junior partners outperformed the graduate students (and the managers): they indicated the most appropriate judgments with minimum judgment bias and maximum judgment consensus—and the highest level of judgment confidence. Reported judgment models based on attribute judgments made by the participants explain why the differences in performance occurred. Results are also reported on the calibration of loan collectibility judgments, i.e., the extent to which confidence judgments are correlated with judgment errors: a significant correlation is indicated for the more experience auditors.
Academic versus Practical Experience as Relative Determinants of Judgment Performance and Confidence

“So we need to know: What helps, what hinders the achievement of good judgment? We are just beginning to learn about that. Second, how does one acquire competence in judgment? Can it be taught? Or must we depend on experience? We know little about this.” (Hammond, K. 1996, 7)

INTRODUCTION

An important professional judgment made by an auditor of a financial institution is the collectibility of selected commercial loans to assess the estimated uncollectible portion, if any, of a financial institution’s loan portfolio (Wright 2001). Commercial loan judgments can be difficult; they are demanding cognitively, information intensive, and highly contextual (Wright and Willingham 1997). Academic instruction and experience provide for acquisition of relevant “credit analysis” knowledge; practical experience may serve to extend and refine the knowledge—but the relative benefits of academic versus practical experience remain unclear and worthy of research (e.g., Bonner and Walker 1994; Hammond 1996).

The objectives of this research are to test for the relative benefit of task-specific graduate academic instruction and experience (cf. Bonner and Walker 1994) versus task-specific CPA training and practical experience when making loan collectibility judgments. The auditor judgments reported by Wright (2001) will be used to benchmark the judgments of graduate business school students. The criteria are judgment appropriateness (error), bias, and interauditor consensus, plus judgment confidence.

First, to test for any benefit of academic task instruction and experience, loan judgments made by second-year graduate business students completing an elective course in credit analysis are compared with judgments made by audit seniors with similar levels of business experience who had not received any credit analysis instruction/training. Demonstrating the benefit of academic instruction, the graduate students’ judgments are significantly more appropriate and less biased given the criterion of the average judgment of 12 highly experienced financial institution audit partners. Second, as a test of the benefits of academic instruction versus task-specific CPA firm training and practical experience, the judgments of the graduate students are compared with judgments provided by experienced audit managers: comparable levels of judgment performance are indicated for both groups. Third, to test for any incremental benefit of additional (and considerable) task-specific experience, comparisons are made of loan judgments made by senior managers/junior...
partners with those of the graduate students. The senior managers/junior partners
outperform the graduate students (and the managers): they indicate the most appropriate
judgments with minimum judgment bias and maximum judgment consensus--and the highest
level of judgment confidence. The participants also evaluated six aspects of the borrower’s
repayment ability; reported models that relate loan judgments to the attribute judgments
reveal why differences in performance occurred.

**LOAN COLLECTIBILITY JUDGMENTS AND KNOWLEDGE REQUIREMENTS**

**Academic Experience and Loan Judgment Performance**

Evaluation of loan collectibility is a semi-structured and complex audit judgment task
(cf., Abdolmohammadi and Wright 1987; Bonner 1994). While credit analysis concepts and
ratio computations provide causal indications, a commercial loan collectibility judgment is not
algorithmic. Different collectibility concepts and, therefore, different items of information, are
applicable to different degrees in alternative collectibility situations, especially for complex
loan repayment situations (Wright and Willingham 1997). Several types of knowledge are
relevant including general domain and task-specific knowledge (Bonner and Lewis 1990). As
a result, auditors specializing in audits of financial institution clients only begin their
collectibility instruction after they accumulate enough business experience and reach the
rank of senior.

Academic loan judgment instruction, typically a graduate business school endeavor,
provides for learning of credit analysis concepts and methods. Bonner and Walker (1994,
159) note that learning of declarative knowledge is customary given academic instruction
(e.g., awareness of salient borrower financial attributes and data that are diagnostic of those
attributes); however, some form of practice with feedback is necessary for students to
develop procedural knowledge, e.g., how to reach loan collectibility judgments. (See
Anderson (2000, 237-239) for definitions of declarative and procedural knowledge.) They
indicate that procedural knowledge can be developed if "understanding rules" precede
practice with outcome feedback being available; provision of causal theory in advance is also
helpful (Bonner and Walker, 1994, 160-161; also Hirst and Luckett 1992). Understanding
rules combine explanation for why procedures are useful with indications of procedures to be
performed ("how-to" rules) (Bonner and Walker 1994). Understanding rules are more general
than context-specific explanatory feedback however explanatory feedback is effective for
development of procedural knowledge. This overall process of learning and using declarative
and procedural knowledge, and receiving cognitive process and outcome feedback, can be
thought of as a form of “academic experience” (Bonner and Walker 1994; Bonner and Pennington 1991, 33-36).

Graduate task instruction and experience is well-suited for performance of the loan evaluation task; credit analysis concepts and methods are directly relevant. MBA-level credit analysis courses provide several opportunities for procedural (and declarative) knowledge to be developed. Learning is facilitated when students explain loan repayment situations and receive judgment process (and outcome) feedback immediately (Chi et al. 1989). For instance, examples of appropriate (and inappropriate) reasoning are generated during case discussions and lectures and via feedback on homework assignments, case analyses, and examinations. Both understanding rules and how-to rules are presented. Explanatory feedback is provided on student judgment processes and judgments. Many times an outcome or case solution is available to facilitate learning (Bonner and Walker, 1994, 160). Availability of the causal framework of credit and cash flow analysis is helpful. Therefore, graduate students learn how to mentally integrate information on borrower attributes into a collectibility judgment; these information-judgment linkages provide procedural knowledge (Anderson 1982; Holyoak 1990, 118-125). In contrast, undergraduate classes emphasize learning (and retrieval) of facts and accounting model relationships, and how to rules to complete structured assignments (Bonner and Walker, 1994). The following one-tailed hypothesis (stated in alternative form) is suggested:

**H1:** Graduate academic instruction and experience will result in significantly better loan collectibility judgments relative to no task instruction or experience.

**Practical Experience and Loan Judgment Performance**

While academic (and CPA firm) instruction may facilitate knowledge acquisition, researchers (e.g., Bedard and Chi 1993, 31-35; Bonner and Pennington 1991, 27-33; Davis and Solomon 1989; Libby 1995) have suggested that practical task-specific experience, and feedback received on one’s judgments, are needed to accumulate the substantial and refined knowledge necessary for superior judgments. First, practical experience should result in better declarative understanding of which underlying financial attributes of the borrower are diagnostic in specific borrower situations (Bonner 1990, 78) and which data are most diagnostic of attributes (Bedard 1989, 120; Choo and Trotman 1991, 467). Second, experience analyzing borrowers in different situations may lead to more empirically valid categorization of types of repayment situations (Chi et al. 1981; Murphy and Medin 1985) and, therefore, to better judgments of loan collectibility (cf., Lurigio and Carroll 1985; Murphy
and Wright 1984). As noted by Lurigio and Carroll (1985, 1123), schemata for different category members may be “...more detailed, more meaningful, and better articulated with experience.” Third, practical experience may also refine the process of integrating information into a loan collectibility judgment via learning of more valid procedural knowledge (Anderson 1982, 1987). However, academic experience may also provide at least some of these benefits (Bonner and Walker 1994).

Acquisition of procedural knowledge may be facilitated by several forms of judgment process feedback received by a financial institutions auditor. Given quality assurance concerns, managers and partners review the reasoning and loan conclusions of subordinates. Auditors may consult with their peers concerning their reasoning. Finally, loan collectibility conclusions must be explained and documented in the work papers, with this accountability motivating well articulated judgment process description--and feedback (Tan and Kao 1999). Also, auditors may receive loan outcome feedback during the subsequent audit. In conclusion, and in contrast to many audit judgment contexts, multiple forms of judgment process and outcome feedback are provided.

Relative to graduate business students, financial institution audit managers have completed the firm’s task-specific training and have obtained significant practical experience evaluating commercial loans. Therefore, audit managers may outperform graduate students. Alternatively, if the benefit of concentrated academic instruction and experience exceeds the benefit of periodic CPA training classes and practical experience, graduate students will outperform audit managers, suggesting the second two-tailed hypothesis:

**H2:** The training and practical experience completed by financial institution audit managers will result in different judgments compared with those provided by graduate students with academic instruction and experience.

Financial institution senior managers have benefited from their having considerable task-specific experience evaluating commercial loan collectibility. Also, constituting face validity for their knowledge, they provide guidance and feedback to subordinates, particularly concerning difficult loan judgments, suggesting the following one-tailed hypothesis:

**H3:** The training and considerable task-specific practical experience completed by senior financial institution audit managers will result in better judgments than those of graduate students with academic instruction.
Judgment Confidence and Loan Judgment Performance

Judgment confidence is thought to reveal the underlying uncertainty in one’s judgment (e.g., Haka et al. 2000) and may affect the use of audit evidence (Bamber and Ramsay 2000). Academic instruction and experience may result in different levels of judgment confidence for graduate students versus auditors who have completed their firm’s instruction and have obtained practical experience evaluating loans, suggesting (versions of) the following two-tailed (alternative) hypothesis:

**H4a:** Levels of judgment confidence will be different for the graduate students versus the auditors.

If graduate students and auditors have valid insight into the appropriateness (and subjective uncertainty) of their loan judgments, loan judgment confidence indications would be correlated negatively with the absolute magnitudes of their loan judgment errors. Alternatively, given the complexity of the loan judgment, the cognitive demands and the knowledge requirements, there may not be a significant relationship between confidence indications and loan judgment errors. For both the graduate students and the groups of auditors the following one-tailed hypothesis is suggested:

**H4b:** Levels of judgment confidence will be correlated negatively with levels of judgment error.

Measures of Judgment Performance

Four measures of loan evaluation performance are applied here. First, given the information available at the time, smaller judgment errors are preferred. Second, judgment bias is relevant: over-estimation of loan collectibility can lead to over-estimation of client income and assets; under-estimation, given client exclamation, can result in excessive compensating audit work and possible loss of a client. Third, given the considerable effort expended by accounting firms to increase judgment consensus, higher judgment consensus is desirable. Fourth, the degree of judgment confidence indicated may reveal the inherent uncertainty, or a lack thereof, in a person’s reasoning and loan judgment, and therefore may affect the behavior of other auditors. Therefore, a measure of loan judgment confidence is included—and it is compared with the magnitudes of the judgment errors.
EXPERIMENT

Participants

Four groups of subjects participated: (1) 33 second-year graduate business students who were completing an elective class in credit analysis concepts and methods and had approximately three years of business experience; and, from Wright (2001) for comparison, (2) 34 financial institution audit seniors who were just starting their first credit analysis training class also with approximately three years of business experience but without practical experience evaluating loans—auditors are not permitted to evaluate loans until they have the business experience characteristic of a senior; (3) 35 audit managers who had completed all applicable training and had accumulated significant experience assessing loan collectibility; and (4) 17 very experienced financial institution senior managers and junior partners.1 Use here of financial institution auditing specialists is important because they complete task-specific training and accumulate knowledge of loan repayment conditions. Also, the auditors were practicing in areas where their clients typically have loans outstanding to companies in the microcomputer industry (the loan context for this study).

Partitioning auditors according to their achieved rank in addition to a simple time of experience measure incorporates: (1) validated differential experience and knowledge; (2) sufficiently positive performance evaluations; and (3) the hiring of individuals by CPA firms with other than CPA-firm experience (e.g., financial institution experience) at other than the entry level (Abdolmohammadi 1999). Also, it is likely that promoted auditors are more highly motivated toward their profession, resulting in better judgments (Shanteau 1992). Concerning their auditing experience, the seniors indicated an mean of 29 months, while the managers reported a mean of 57 months and the senior managers/junior partners indicated a mean of 93 months of auditing experience, with each increment in experience being significant (p<.01).

Design

To test the academic instruction and experience hypothesis, H1, the judgments of the graduate students are compared with the judgments of the uninstructed and inexperienced (senior) auditors. Both groups, however, possessed approximately three years of general business experience (cf., Bonner and Lewis 1990). The 33 graduate students were completing an elective course on credit analysis concepts and methods; they reported that they did not have any loan evaluation experience. Class discussions and exercises, and a
major project, required the students to apply their knowledge by analyzing several companies in the microcomputer industry. The senior auditors were just starting their initial loan collectibility training class. Examination of their training materials revealed that the case and ratio analyses were elementary. While most of the students indicated none, seven of the 33 indicated some, and five of the seven indicated 12 or more months of “general financial analysis” experience. No auditing experience was indicated. The 34 senior auditors indicated a mean [median] of 10.5 [11] months of general financial analysis experience.

As a test of the benefit of academic instruction and experience versus CPA firm instruction and practical experience, hypothesis H2, the judgments of the graduate students are compared with the loan judgments completed by the instructed and experienced managers. The 35 audit managers had significant task-specific experience evaluating borrowers and loans, and reviewing loan analyses conducted by audit seniors. They indicated a mean [median] of 38 [36] months of general financial analysis experience.

Finally, the loan judgments made by graduate students are compared with those of the senior managers and junior partners, i.e., hypothesis H3. The 17 senior managers and junior partners reported a mean [median] of 68 [65] months of general financial analysis experience. In addition to their overall responsibility for a financial institution audit, they conduct and review loan evaluations, particularly in difficult and complex repayment situations. Therefore, this final comparison will address the benefit, if any, of significant additional (and considerable) task-specific practical experience relative to the judgments of the graduate students.

**Task and Materials**

The participants reviewed an unsecured commercial loan to a fictitious manufacturer of microcomputers (Wright 2001). A comprehensive narrative described the company’s past economic performance and prevailing economics. Actual financial statements for a microcomputer manufacturer were adapted to reflect deteriorating results and prospects for the borrower; adapted balance sheet, income and cash flow statements over a three year period were provided. Several financial ratios were included, as were industry data. The material was presented in a generic format. The disposition of the lender with regard to loan repayment was indicated.

The participants judged the percentage of the loan that would be collected on the due date approximately 12 months into the future. Also reported was their confidence in their
loan judgment using the following question: “Given the information you have reviewed, what is your level of confidence in your loan collectibility decision?” on a 1 to 7 scale with 7 being labeled "very strong confidence" and 1 being labeled "very weak confidence."

The participants also concluded on several attributes of the borrower. Using a seven-point scale with end points labeled “very strong,” (=7) and “very weak,” (=1), and a mid-point of “average,” (=4), the following attribute conclusions were reached (also see Table 3): (1) the projected ability of the borrower to meet its short-term obligations over the upcoming 12 months (Liquid), (2) the trend of this ability over the preceding three years (TLiquid), (3) the current ability of the borrower to generate cash via long-term borrowing, sale of available assets and generation of cash flows in order to meet its interest and principal payments as they become due (Cash), (4) the trend in this cash generation ability over the previous three years (TCash), (5) the expected profitability of the borrower over the upcoming 24 months relative to other firms in the industry (Profit), and (6) the trend in profitability levels over the previous three years (TProfit). Note that three status (Liquid, Cash and Profit) and three trend (TLiquid, TCash and TProfit) conclusions were provided by each participant.

**Determination of the Judgment Criterion**

Twelve senior financial institution audit partners with a mean of 16.1 years of experience also evaluated the collectibility of the loan; the average of their judgments provides the criterion for the loan judgments. The average of their loan judgments is 2.07 million, with a median of 1.95, and a standard error of .31 million. Their loan evaluation experience, industry knowledge, and professional standing support their use as appropriate judges (see Wright 2001). The participants are evaluated here as they would be in professional practice, i.e., relative to what their knowledgeable superiors would conclude at the time of the judgment (Gibbins and Jamal 1993, 452-453).

Use of an expert judgment criterion here is more appropriate than use of an actual loan and the eventual collection thereof (see Wright 2001). During the time interval between the date of the judgment and the due date of the loan (here approximately 12 months) many presently unknown events will occur that can directly impact eventual loan collection. First, the borrower will implement new economic decisions that can affect eventual loan collection. Second, the economic conditions that occur for the borrower during the intervening period may not be what were expected. Third, the lender will implement an aggressive or tolerant
position with regard to repayment at the due date that may have a large effect on the amount eventually collected.

**Procedure**

The materials were administered in a classroom setting for each group. General introduction was provided, clarifying questions were answered, and the materials were distributed. The time required for completion ranged from 30 to 40 minutes.

**RESULTS**

**General Results**

Concerning their motivation, the participants were asked whether: (1) “The case and the questions were interesting to think about” and (2) “The description of American Computers was realistic.” The seven-point scale had a maximum of “strongly agree” and a minimum of “strongly disagree.” The mean of the student “interest” responses is 5.86, compared with means of 5.60, 5.36, and 5.72 for the seniors, managers, and senior managers/junior partners, respectively, without a significant difference, F(3, 114)=1.28, n.s., relative to a mean of 6.29 for the 12 senior partners. The corresponding means for the “realism” question are 5.42 versus 5.78, 5.59, and 5.88, again without any significant differences, F(3, 114) = <1, n.s., relative to a mean of 6.50 for the 12 senior partners. The results suggest considerable interest in, and perceived realism of, the study materials.

Impact of Academic Experience on Judgment Performance

The first hypothesis is that academic task instruction and experience will result in better loan judgments. Error distribution characteristics are reported in Table 1 and are graphed in Figure 1. Academic instruction and experience were beneficial: the instructed graduate students’ loan judgment errors are significantly smaller than those of the uninstructed seniors, i.e., a mean absolute error of 2.12 versus 4.15 million, a significant difference, t=3.26, p<.001, one-tailed (see Table 1, Panel A). The graduate students avoided large errors and the seniors did not. (The mean absolute judgment error for the seven students who indicated some general financial analysis experience is 1.60 million.) Additionally, the graduate students provided less biased loan judgments than did the seniors:
their mean signed judgment error is 1.87 million versus 3.68 million for the seniors, \( t=2.49, p<.01 \), one-tailed. (Note that if any of the seniors had obtained any knowledge of credit analysis concepts and methods through self-study or some other exposure, this would bias against finding an effect of academic instruction and experience for the graduate students.) The graduate students also displayed significantly more consensus than did the seniors given their lower judgment standard deviation of 2.18 versus 3.63 million, \( F=12.67, p<.001 \). Finally, concerning loan judgment confidence, the graduate students and auditors indicated similar levels; the mean confidence for the graduate students is 3.41 versus 3.76 for the senior auditors, \( t=1.16, p=.25 \), two-tailed (see Table 2). The first hypothesis is supported: graduate students having completed task-specific credit analysis instruction and experience generated smaller judgment errors and less biased judgments, and higher judgment consensus, relative to the uninstructed and inexperienced seniors. Both groups indicated similar levels of judgment confidence.

**Impact of Practical Experience on Judgment Performance**

Concerning the second hypothesis, a similar level of performance is revealed for the judgments of the graduate students and the judgments of the experienced (and instructed) audit managers. The mean absolute judgment error for the graduate students is not significantly different from the mean judgment error of the managers, 2.12 versus 2.89 million, \( t=1.50, p=.14 \), two-tailed. Concerning judgment bias, the mean bias for the graduate students is 1.87 versus 2.40 million for the managers, a difference that also is not significant, \( t=.87, p=.38 \), two-tailed. The graduate students agree with each other more than do the managers given judgment standard deviations of 2.18 versus 2.79 million, \( F=3.13, p=.08 \), two-tailed. However, the audit managers were significantly more confident in their loan judgments given a mean of 4.11 versus 3.41, \( t=2.64, p=.01 \), two-tailed. CPA firm training and practical experience did not result in loan judgments that were more appropriate or less biased than those of the graduate students with academic instruction and experience in credit analysis. However, the graduate students exhibit significantly better judgment consensus and the audit managers indicate significantly higher levels of judgment confidence.

Hypothesis three predicts that the experienced senior managers/junior partners will achieve better judgment performance than will the graduate students. While the mean absolute error of 1.66 million achieved by the senior managers/junior partners is lower than the mean absolute error of 2.12 achieved by the graduate students, the difference is not
significant \( t = 0.983, p = 0.16 \), one-tailed.\(^4\) Their smaller judgment bias, 1.46 versus 1.87 million, also is not significant, \( t = 0.765, p = 0.23 \), one-tailed. Similar levels of judgment consensus are indicated for both groups, i.e., the senior managers’ judgment standard deviation of 1.59 versus 2.18 million for the graduate students, \( F = 1.75, \text{n.s.} \). Finally, similar to the confidence results for the managers, the senior managers/junior partners were significantly more confident in their judgments than were the graduate students given a mean confidence level of 4.28 versus 3.41 for the graduate students, \( t = 2.55, p < 0.01, \text{two-tailed} \).

**Judgment Performance and Models of Judgment**

The graduate students outperformed the seniors and provided judgments similar to those of the audit managers but not the senior managers. Given that the participants provided both loan collectibility judgments and judgments of borrower attributes, judgment models may illuminate why their loan judgments were different and explain why the graduate students performed so well. Table 3 provides the correlations of loan and attribute judgments, and tests of different judgment models, for the graduate students and the seniors and managers. (There are not enough observations to reliably estimate the models for the senior managers.)

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Insert Table 3 about here

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Research reported by Wright and Willingham (1997, WW hereafter) provides a multi-level process model of expert loan collectibility evaluation. Using the WW theory, we test three different judgment models; availability of the WW theory is helpful given the high multicollinearity among the six attribute judgments and relatively few degrees of freedom relative to the number of parameters that could be estimated. For an unsecured loan (such is the case here), WW indicate three first-level judgment subgoals in the following order of decreasing diagnosticity: Current financial condition of the borrower, expected cash flow from operations, and the performance of the borrower in meeting obligations of previous loans. In order to reach a conclusion on the first-level borrower’s current financial condition, three second-level judgments are needed. The most diagnostic second-level subgoal is the expected liquidity of the borrower to meet short-term financial commitments, a concept that corresponds directly to the Liquid attribute judgment provided by the participants. The second most diagnostic second-level subgoal judgment for the borrower’s current financial condition conclusion is financial risk specified as the borrower’s current leverage position and ability to issue new debt and equity securities, which relates directly to the Cash attribute judgment...
obtained in the current study. (The third of the three level-two subgoals is business risk.) Therefore, the first judgment model to be tested will include the Liquid and Cash attribute judgments (see Table 3); the second model will add the two related trend judgments, i.e., TLiquid and TCash.

In addition to the borrower’s current financial condition, the WW research reports a second level-one subgoal: Expected cash flow from operations over the next 27 months. The Profit attribute judgment obtained here directly implies expected cash flow from operations over the next 24 months, although the Cash attribute also reflects the borrower’s ability to produce cash (via long-term borrowing, sale of assets or cash flow from operations) and, therefore, partially overlaps the meaning of the Profit attribute. To include the Profit and TProfit attributes, and provide an overall demanding test of attribute importance, the third judgment model tested includes all six attribute judgments in a stepwise regression (p<.10). The results from testing of the models are reported in Table 3.

First, the results for the graduate students are clear (Panel A): the Liquid and Cash attributes, corresponding to the borrower’s ability to meet short-term obligations and to generate cash to meet debt commitments, are the most important attributes for their loan judgments. In contrast, the results for the senior auditors are equally clear: they relied on their judgment of the borrower’s short-term liquidity, the Liquid attribute (Table 3, Panel B). The graduate students provided significantly more appropriate loan judgments than did the seniors; their additional emphasis on the Cash attribute, i.e., the ability of the borrower to generate cash from different sources, and relatively less emphasis on the Liquid attribute, served them well.

Second, for the graduate students and the audit managers, for which similar levels of judgment performance are indicated, similar judgment models are also indicated. The graduate students clearly emphasized Liquid and Cash. The managers indicate more significant loan-attribute correlations among the highly correlated borrower attributes (Table 3, Panel C), but, when the first model (Liquid, Cash) and the second incremental trend model are tested, only Cash is significant. However, the third (stepwise regression) model yields a conclusion similar to the results for the graduate students: emphasis on Cash attribute and the recent trend (versus the current level) in the borrower’s liquidity (TLiquid).
Judgment Performance and Judgment Confidence

Concerning hypothesis 4a, similar levels of judgment confidence are reported by the seniors, managers and senior managers/junior partners; i.e., respective means of 3.76, 4.11 and 4.28, $F(2,83) = 1.66$, n.s., (see Wright 2001). However, the loan judgment confidence mean of 3.41 for the graduate students is significantly lower than the mean judgment confidence indicated by the three groups of auditors, $t= 2.74$, $p<.01$, two-tailed (see Table 2). Do the more confident auditors have superior insight into their loan judgment performance?

Concerning hypothesis 4b, reported in Table 2 are the correlations for the judgment confidence indications and the absolute values of the loan judgment errors. The correlation for the graduate students is an insignificant -.048 ($p=.395$); their confidence indications are not informative concerning their relative judgment performance. The uninstructed and inexperienced seniors indicate a positive correlation of .245 ($p=.08$), an unexpected result. For the experienced auditors, as is hypothesized, the managers indicate a significant negative correlation of -.224 ($p<.10$) and the senior managers/junior partners indicate an insignificant negative correlation of -.083 ($p=.376$). When the managers and senior managers are pooled, a significant negative correlation of -.204, $p=.07$, is obtained. While the graduate students do not convey information concerning their judgment performance, as auditors gain task-specific experience, their judgment confidence indications become valid indications of their judgment performance.

**DISCUSSION**

Task-specific knowledge obtained via academic instruction permitted graduate students to outperform financial institution auditors who were just starting their first CPA firm class in credit analysis and had not evaluated commercial loan collectibility. (This test of the first hypothesis also serves as a positive internal validity check on the impact of the instruction.) The graduate students’ elective course included explication of the concepts and methods of credit analysis, with judgment process and outcome feedback being provided. Bonner and Pennington (1991, 36), when analyzing the relative benefits of instruction versus practical experience, indicate that “...learning is best facilitated when there is a well-developed domain theory and people receive instruction in that domain theory prior to
practicing the task.” Instruction in the ‘theory’ of credit analysis clearly helped the graduate students.

Commercial loan collectibility analysis is a complex judgment task that requires significant knowledge of business conditions, businesses and repayment potential. In contrast to undergraduate (auditing) students, graduate business students completing a credit analysis elective class have enough general business awareness to understand the judgment context; for the same reason, only when an auditor reaches the level of senior (approximately three years of experience) do they begin their credit analysis training (and they have not been auditing the collectibility of loans). Credit analysis instruction is not typically offered to undergraduate accounting majors. Therefore, graduate business students having completed credit analysis instruction are compared with similarly experienced audit seniors without any task-specific instruction.

Concerning the second hypothesis, the graduate students provided loan judgments that are not significantly different from those of experienced (and instructed) audit managers. This finding of a positive impact of academic instruction and experience relative to the benefit of practical experience warrants further research (cf., Bonner and Walker 1994). One implication may be that graduate students with applicable academic instruction and experience may be employed as surrogates for professionals in judgment studies to an extent that may not have been realized previously (Ashton and Kramer 1980).

Focusing exclusively on the auditors (see Wright 2001), a joint test of the benefit of CPA firm instruction and practical loan evaluation experience indicated significantly better loan evaluations: Audit managers outperformed audit seniors. Most important, additional significant task-specific experience resulted in further significant improvement in loan judgments since the senior managers and junior partners outperformed the managers. Commercial loan analysis satisfies a condition suggested by Bonner and Pennington (1991, 39) for experience to be a basis for developing expertise, i.e., “…an auditor must be able to gain the skills he or she requires for good [task-specific] performance during that time, through instruction, practice, and feedback.”

Some limitations of this research provide opportunities for future research. First, I did not determine the explicit differences in the knowledge of the graduate students relative to the knowledge of the seniors, managers, and senior manager/partners; in addition to the borrower attribute judgments studied here, such information would further inform why the differences in judgment performance occurred. Second, differences in general problem
solving ability may partially explain the differences in performance (Bonner and Lewis 1990), however Bonner and Walker (1994) report that differences in ability were related to degrees of knowledge acquisition but not to differences in judgment performance.
REFERENCES


Figure 1—Absolute and Signed Judgment Error Distributions

Subject Groups

Absolute Values of Judgment Errors

Signed Values of Judgment Errors

N = 34  35  17  33
Seniors  Senior managers  Managers  MBA students

N = 34  35  17  33
Seniors  Senior managers  Managers  MBA students
### TABLE 1
Loan Collectibility Judgment Errors
(Relative to the 13 million dollar loan amount)

**Panel A — Absolute Values of the Judgment Errors**

<table>
<thead>
<tr>
<th>Panel</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate Students (33)</td>
<td>2.12</td>
<td>1.55</td>
<td>1.92</td>
<td>[.12, 6.25]</td>
</tr>
<tr>
<td>Seniors (34)</td>
<td>4.15</td>
<td>3.06</td>
<td>3.06</td>
<td>[.27, 9.33]</td>
</tr>
<tr>
<td>Managers (35)</td>
<td>2.89</td>
<td>2.48</td>
<td>2.26</td>
<td>[.12, 7.68]</td>
</tr>
<tr>
<td>Senior Managers/Partners (17)</td>
<td>1.66</td>
<td>1.03</td>
<td>1.36</td>
<td>[.12, 4.30]</td>
</tr>
</tbody>
</table>

**Panel B — Signed Values of the Judgment Errors**

<table>
<thead>
<tr>
<th>Panel</th>
<th><em>Mean of Positive Errors</em></th>
<th><em>Mean of Negative Errors</em></th>
<th>Std. Dev.</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate Students (33)</td>
<td>1.87</td>
<td>-2.35</td>
<td>2.18</td>
<td>[-1.94, 6.25]</td>
</tr>
<tr>
<td>Seniors (34)</td>
<td>3.68</td>
<td>-4.59</td>
<td>3.63</td>
<td>[-2.07, 9.33]</td>
</tr>
<tr>
<td>Managers (35)</td>
<td>2.40</td>
<td>-3.57</td>
<td>2.79</td>
<td>[-2.07, 7.68]</td>
</tr>
<tr>
<td>Senior Managers/Partners (17)</td>
<td>1.46</td>
<td>-2.04</td>
<td>1.59</td>
<td>[-1.03, 4.30]</td>
</tr>
</tbody>
</table>

*Positive errors correspond to over-statements of loan collectibility; negative errors correspond to under-statements.*
<table>
<thead>
<tr>
<th>Participants</th>
<th>Loan Judgment Confidence Indications Mean (Std. dev.)</th>
<th>Correlation of Absolute Values of Judgment Errors and Loan Judgment Confidence Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate Students (33)</td>
<td>3.41 (1.23)</td>
<td>-.048 (p= .395)</td>
</tr>
<tr>
<td>Seniors (34)</td>
<td>3.76 (1.22)</td>
<td>+.245 (p= .081)</td>
</tr>
<tr>
<td>Managers (35)</td>
<td>4.11 (.95)</td>
<td>-.224 (p= .098)</td>
</tr>
<tr>
<td>Senior Managers and Junior Partners (17)</td>
<td>4.28 (.96)</td>
<td>-.083 (p= .376)</td>
</tr>
<tr>
<td>Managers and Senior Managers/Junior Partners (52)</td>
<td>4.17 (.95)</td>
<td>-.204 (p= .073)</td>
</tr>
</tbody>
</table>
TABLE 3
Models of Loan Judgments and Borrower Attributes

Within each panel, first indicated are the Pearson correlations for the loan judgments and the six borrower attributes; the following three rows provide the significant regression coefficients for each of the three judgment models.

(Positive signs predicted for all correlations and coefficients; one-tailed tests)

<table>
<thead>
<tr>
<th>Correlations, then the three judgment models</th>
<th>Expected Liquidity (Liquid)</th>
<th>Trend in Liquidity (TLiquid)</th>
<th>Generate Cash (Cash)</th>
<th>Trend in Generation of Cash (TCash)</th>
<th>Expected Profit (Profit)</th>
<th>Trend in Profit (TProfit)</th>
<th>Model Signif.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: Graduate Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n=33)</td>
<td>.427***</td>
<td>.147</td>
<td>.421***</td>
<td>.080</td>
<td>.192</td>
<td>-.085</td>
<td>---</td>
</tr>
<tr>
<td>(1) Liquid, Cash</td>
<td>.727**</td>
<td></td>
<td>1.006**</td>
<td></td>
<td></td>
<td></td>
<td>p=.011</td>
</tr>
<tr>
<td>(2) Liquid, TLiquid, Cash, TCash</td>
<td>1.084**</td>
<td></td>
<td>1.142**</td>
<td></td>
<td></td>
<td></td>
<td>p=.035</td>
</tr>
<tr>
<td>(3) All six, stepwise (p=.10)</td>
<td>1.130**</td>
<td></td>
<td>1.255**</td>
<td></td>
<td></td>
<td></td>
<td>p=.011</td>
</tr>
<tr>
<td>Panel B: Seniors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n=34)</td>
<td>.443***</td>
<td>.222</td>
<td>.294**</td>
<td>.146</td>
<td>-.021</td>
<td>.137</td>
<td>---</td>
</tr>
<tr>
<td>(1) Liquid, Cash</td>
<td>1.277***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p=.020</td>
</tr>
<tr>
<td>(2) Liquid, TLiquid, Cash, TCash</td>
<td>1.839**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p=.075</td>
</tr>
<tr>
<td>(3) All six, stepwise (p=.10)</td>
<td>1.723***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p=.009</td>
</tr>
<tr>
<td>Panel C: Managers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n=35)</td>
<td>.276**</td>
<td>.333**</td>
<td>.356**</td>
<td>.243*</td>
<td>.272*</td>
<td>.303**</td>
<td>---</td>
</tr>
<tr>
<td>(1) Liquid, Cash</td>
<td>.901**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p=.068</td>
</tr>
<tr>
<td>(2) Liquid, TLiquid, Cash, TCash</td>
<td>.885*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p=.088</td>
</tr>
<tr>
<td>(3) All six, stepwise (p=.10)</td>
<td>.483**</td>
<td></td>
<td>.814**</td>
<td></td>
<td></td>
<td></td>
<td>p=.018</td>
</tr>
</tbody>
</table>

***Significant at the 0.01 level (1-tailed),
**Significant at the 0.05 level (1-tailed),
*Significant at the 0.10 level (1-tailed)
1 All of the audit seniors are from the same “Big 6” audit firm, as are 22 of the 35 audit managers; the other 13 managers are from four other “Big 6” firms. The 17 senior managers and partners are from five “Big 6” firms.

2 All of the auditors were asked to be as accurate as possible. A modest reward was provided for a small number of the best-performing auditors.

3 For the auditors, it is worthwhile to note that the CPA firm training and experience did result in better judgments (see Wright 2001). The mean error of 2.89 million for the managers is significantly lower than the mean error of 4.15 million for the seniors, t=2.07, p<.05. The mean judgment bias for the managers is also lower, 2.40 versus 3.68 million for the seniors, t=1.91, p<.05 (see Table 1, Panel A). The level of consensus also improved: the standard deviations of the judgment distributions are 2.26 million for the managers versus 3.06 million for the seniors.

4 Comparing the senior managers/junior partners to the managers, they reveal superior judgment performance (see Wright 2001). Relative to the mean error of 2.89 million for the managers, their incremental improvement in loan judgment performance to 1.66 million is significant, t=2.06, p<.05, one-tailed and their judgment bias is significantly less, 1.46 versus .240 million, t=1.30, p=.10.