

**Experience, Machiavellianism, Decision Aid Use and Going Concern Assessment: An Empirical Study**

Anamitra Shome  
Assistant Professor  
Dept. of Accounting & Finance  
Brock University  
St. Catharines, ON L2S 3A1, Canada  
Work phone: (905) 688-5550 ext. 4540  
Work fax: (905) 688-9779  
Home phone: (905) 988-9510  
Home fax: (905) 988-9003  
E-mail: ashome@brocku.ca  
Topical area: Accounting Behavior and Organizations

Hema Rao  
Assistant Professor  
Accounting, Finance and Law  
School of Business  
SUNY – Oswego  
Oswego, NY 13126  
Work phone: (315) 312-2522  
hrao@oswego.edu

\* corresponding author

We are grateful to Professor Barry Cushing and Captus Press Inc. for permission to use the case from Cushing (1996).

## **Experience, Machiavellianism, Decision Aid Use and Going Concern Assessment: An Empirical Study**

### **SUMMARY**

Research on the effect of experience on auditor judgment and decision-making has found results generally consistent with positive experience-related effects on auditor judgment performance. Despite this, audit firms have been known to fail in the performance of their attestation function, with much ensuing public disaffection. This study investigates the effect of experience, Machiavellianism, and decision aid use on going concern assessment. We posit that experienced auditors, while developing lower levels of Machiavellianism in proportion to their growth in experience, may actually suffer a reduction in their ability to discriminate between relevant and irrelevant information. This may render them susceptible to the dilution effect, with subsequent impairment in decision performance despite the use of decision aids. The study finds evidence to support this prediction.

**Key Words:** Diagnostic information, nondiagnostic information, the dilution effect, Machiavellianism, cognitive moral development, decision aids.

**Data availability:** Contact the authors.

## INTRODUCTION

Solomon and Shields (1995, 138) characterize auditing as a process of appraising the validity of an assertion vis-à-vis specified criteria and reporting the findings to interested parties. In performing this function, the auditor has to carry out several tasks, ranging from relatively structured (Keen and Scott-Morton 1978) to unstructured. While the problem and its solution are clearly defined for structured tasks, unstructured tasks are characterized by ill-defined problems lacking clear-cut solutions. The latter require the decision maker to use his or her professional judgment to a considerably greater degree than the former (Abdolmohammadi 1987). Traditionally, while the structured tasks are usually carried out by the less experienced auditors (such as audit juniors and seniors), the unstructured tasks are typically performed by managers and partners on the assumption that they possess the knowledge base appropriate for such tasks.

Ever since Ashton's (1974) seminal study on auditor judgment, an enormous volume of research has contributed to the extant state of knowledge in the area. A large part of this research has focused on the effect of experience on auditor decision making (e.g., Frederick and Libby 1986; Bonner 1990; Ashton 1991). The findings from a majority of these studies provide support for experience-related differences in decision performance.

Despite this evidence, experienced auditors do make costly errors of judgment. One of the unstructured tasks in the auditing process relates to expressing an opinion on the ability of an auditee firm to continue as a going concern. Several prominent bankruptcies of firms that had been given a clean bill of health by their auditors in their most recent financial statements point to the susceptibility of experienced auditors to erroneous judgment, and the ensuing public disaffection (Cormier et al. 1995).

The dilution effect (Nisbett et al. 1981) has been suggested as a factor in sub-optimal decision making. Stated simply, the dilution effect refers to the tendency of decision makers to process irrelevant information as though it were relevant, with resulting deterioration in decision performance. The phenomenon has been investigated in both non-auditing (e.g., Nisbett et al. 1981; Gaeth and Shanteau 1984) and auditing contexts (e.g., Hackenbrack 1992; Shelton 1994). Technological advancements in telecommunications have made enormous volumes of information readily available to decision makers. In such a situation, decision performance may well be determined by the decision maker's ability to sift relevant from irrelevant information.

Personality variables have long been found to affect cognitive information processing (McGhee et al. 1978; Gul 1984). Machiavellianism is one such variable. Christie and Geis (1970) express Machiavellianism as a set of behaviors characterized by emotional detachment, lack of conventional morality, and the tendency to manipulate people and situations. Individuals who score high on Machiavellianism (high Machs) win more in unstructured or ambiguous situations, are distracted less by elements irrelevant to winning, and focus more on the task at hand relative to low Machs (Geis, 1978). We posit, therefore, that high Machs possess the ability to identify irrelevant information to a greater degree than low Machs.

Kohlberg (1981) suggests that an individual's level of cognitive moral development changes with time and experience from pre-conventional to post-conventional, through an intermediate conventional level. Machiavellianism is a personality variable related to the individual's ethical perspective (Christie and Geis 1970) and, therefore, to the individual's level of cognitive moral development. Thus it is possible for individuals who may have been high Machs when younger to become low Machs with the acquisition of experience. We posit, therefore, that individuals with greater experience, having attained higher levels of ethical development, are lower in Machiavellianism than those with less experience. However, this renders them less able to make a distinction between relevant and irrelevant information than those with low experience, leading to sub-optimal decision performance.

Apart from the prevalence of mixed information sets (i.e., those containing both relevant and irrelevant information), another important contextual variable in auditing environments is the availability of decision aids

(Messier 1995). The evidence with regard to the efficacy of decision aids is mixed. Butler (1985), for example, found that decision aids improve subjects' decision performance. Ashton (1990) actually observed decision aids to have a detrimental effect on decision performance. Benbasat and Dexter (1982) report that decision aids may benefit users differentially depending on the users' cognitive styles. In view of the inconsistent results observed in the prior literature, we posit that the interactive effects of experience and Machiavellianism may or may not be affected by decision aid use.

This study seeks to provide some preliminary answers to the following questions: Is Machiavellianism related to experience? Are high Machs more capable of identifying irrelevant information than low Machs? Will this effect hold on controlling for differences in the degree of relevance of the information available? On controlling for the availability of a decision aid?

The rest of the paper is organized as follows. The next section presents a review of the relevant literature and develops the research hypotheses. The second section presents the research methodology. The following section contains the results. A discussion of the conclusions, limitations, and suggestions for further research constitutes the last section of the paper.

## **BACKGROUND AND DEVELOPMENT OF HYPOTHESES**

### **Experience effects in audit decision making**

Several studies have investigated the effect of experience on auditors' decision making. Frederick and Libby (1986) hypothesized that experts would solve the audit problems incorporated in their experimental task through a process of feature matching using two knowledge components: the relations of control weaknesses and account errors and the relations among accounts. Experts and novices participated in a total of five experiments in which they evaluated one of two internal control weakness-financial statement error problems and ranked their possible consequences in terms of their probability. Results demonstrate a knowledge effect in audit-related judgment behavior.

Abdolmohammadi and Wright (1987) conducted a series of experiments examining structured, semi-structured, and unstructured tasks involving experienced and inexperienced auditors. While pooling all subjects together elicited only an isolated experience effect, separating subjects into two groups based on experience produced significant experience related differences.

Task-specific knowledge has been investigated in several studies. Bonner (1990) examined the role of task-specific knowledge in the cue selection and cue weighting components of two audit tasks, analytical risk assessment and control risk assessment. Task-specific knowledge was observed to aid the performance of experienced auditors in both cue selection and cue weighting, but only in the analytical risk assessment task. Libby and Frederick (1990) investigated whether experience leads to an increase in auditors' knowledge of financial statement errors. Subjects performed an experimental task in which they were asked to list material financial statement errors that could have caused changes in some financial ratios for a hypothetical company. The study found evidence for experience-related effects evidencing better organization of error-related knowledge by experienced auditors. Further support for the hypothesis that experienced auditors organize their knowledge of internal controls differently than novices was found in a subsequent study (Frederick 1991).

Ashton (1991) investigated frequency knowledge (i.e., knowledge of the base rates associated with error occurrences) in terms of auditors' error-effect frequency knowledge and error-cause frequency knowledge. She found that even the most experienced auditors have limited direct experience with financial statement errors, a result that suggests that audit experience should be viewed as task-specific rather than all-encompassing. Further support for the task-specific nature of experience comes from Brown and Solomon (1991) who found evidence to suggest that auditors are apparently able to configurally process information over a wide variety of tasks.

Not all studies on experience-related effects on decision performance have reported positive results. Moeckel (1990) asked auditors to review model work papers containing contradictions they would have discovered in the absence of reconstruction or failure to integrate. The task involved drawing upon memory-based knowledge to formulate an accurate representation of the meaning of all the evidence taken together. She found that subjects at all levels of experience made memory errors related to experience, thereby challenging the intuition that experience is positively related to performance in work paper review.

### **The ADilution@ effect**

Several studies have examined judgment and decision making in the context of mixed information sets consisting of both diagnostic and nondiagnostic information. In a study aimed at investigating whether subjects were able to learn to ignore irrelevant cues in multiple-cue probability learning situations, Castellan (1973) found that subjects were not able to ignore irrelevant cue dimensions even after a large number of trials. Troutman and Shanteau (1977) employed a simple Abook bags and poker chips@ task to determine if information that was obviously nondiagnostic would affect judgments. They observed that three different types of nondiagnostic samples (neutral, irrelevant, and null) consistently led to subjects making less extreme inferences. Gaeth and Shanteau (1984) conducted two experiments to determine whether experienced judges were influenced by irrelevant information in a task involving soil judgment. The study found that irrelevant information influenced the judgments of 12 experienced student soil judges. Subsequent interactive training was observed to reduce the influence of irrelevance as well as enhance judgment accuracy.

In a series of studies aimed at determining how people combine items of information that they believe to be diagnostic with items of information they believe to be nondiagnostic, Nisbett et al. (1981) asked subjects to make predictions based on information that had been categorized by pretest subjects as either diagnostic or nondiagnostic. Results consistently indicated that subjects given a mixture of diagnostic and nondiagnostic information made much less extreme predictions than subjects given only diagnostic information. They dubbed this tendency the Adilution@ effect. In an audit-related study, Hackenbrack (1992) had auditor subjects assess how much a given company's exposure to fraudulent reporting changed during a year in which a fraud-related situation had occurred. Other subjects estimated how much each of ten independent fraud-related situations would change their assessment of a company's exposure to fraudulent reporting. Subjects evaluated the same fraud-related situation, first with mixed information, and then with only diagnostic information. The study found that auditor subjects given a mixture of diagnostic and nondiagnostic evidence made decisions that were less extreme than those made by subjects using only diagnostic evidence. Hackenbrack suggests that the results indicate that the nondiagnostic evidence failed to affirm the outcome suggested by the fraud-related evidence, reducing both the perceived similarity between the client and the suggested outcome, as well as the judged likelihood of that outcome. Shelton (1994) did not observe the dilution effect in a going concern task involving experienced auditor subjects. Ibrahim and Shome (1998) did not observe any dilution effects in a similar going concern assessment task, although the use of a decision aid did affect subjects= probability assessments significantly. Shelton (1999) duplicated her earlier study with a mix of experienced and inexperienced auditors. While her results do suggest that experienced auditors are less susceptible to the dilution effect, she did not directly test decision accuracy. This paper makes a contribution by doing so.

### **Machiavellianism**

Christie and Geis (1970) developed the construct of Machiavellianism on the basis of the sixteenth century works of Niccolo Machiavelli. The construct is captured succinctly in Machiavelli=s advice to the Prince for staying in power (Geis 1978, 305):

...the Prince should maintain the public appearance of praising all the conventional virtues of the day, in fact should practice them whenever he could with maximum publicity and minimum cost.

But the Prince should be prepared to take any action, virtuous or otherwise, that might be required to achieve his goals.

Christie and Geis (1970) expressed Machiavellianism as a set of behaviors characterized by emotional detachment, lack of conventional morality, and the tendency to manipulate people and situations. Classifying people into two broad categories (high Machs versus low Machs) based on their orientation with respect to the construct, they concluded (Christie and Geis 1970, 312):

High Machs win more, are persuaded less, persuade others more, and otherwise differ significantly from low Machs in situations in which subjects interact with others, when the situation provides latitude for improvisation and the subject must initiate responses as he can or will, and in situations in which affective involvement with details irrelevant to winning distract Low Machs.

Based on a review of research on Machiavellianism, Vleeming (1979, 295) found overall support for these conclusions, characterizing Machiavellianism as A...the personality dimension on which people can be ordered in terms of a more or less manipulative way of behavior in different interpersonal situations.@

Machiavellian concepts have been perceived to be effective and relevant to modern-day organizations as well (Calhoun 1969). Geis (1978) provides support for this perception by characterizing high Machs as possessing the ability to perform better in unstructured or ambiguous situations where no clear-cut rules are available to aid in decision makingCthe existence of clear-cut choices may actually not provide the high Mach with any advantage. Another characteristic of high Machs is their ability to focus on the situational elements relevant to the task goal, whereas low Machs are easily distracted by the irrelevant ones.

### **Cognitive moral development and Machiavellianism**

Kohlberg (1981) explained variations in individuals= orientations with respect to several ethicality-related dimensions (such as Machiavellianism, for example) in terms of their cognitive moral development. Individuals= cognitions, emotions, and judgment change as a result of gathering life experiences. As a result, individuals attain different levels of moral development (preconventional, conventional, and postconventional) with the passage of time. At the preconventional level, the goodness or badness of an action is determined by the physical consequences of the action. For individuals in the conventional level, conformity to acceptable behavior is paramount. Individuals show respect for authority, recognize the need for social order, and adopt societal norms. Some individuals attain the postconventional level of moral cognitive development. At this stage, they comprehend and apply moral standards that should guarantee each member of society Aequal@ consideration of their claims in every situation. The transition from one phase to the next occurs with the passage of time and the gathering of experience.

Level of cognitive moral development has been found to have an effect on the individual=s ethical decision making (Hunt and Vitell 1993), and studies on Machiavellianism do indicate that Machiavellianism scores vary with age or experience. Hunt and Chonko (1984) found younger marketers to be more Machiavellian than older ones. Rawwas and Singhapakdi (1998) found adults to be more conservative than teenagers and children in terms of their ethical perceptions, Machiavellianism, relativism and idealism. Children were the most tolerant to questionable practices and most Machiavellian and relativistic.

### **Decision aids**

The evidence for the efficacy of decision aids is not entirely unmixed. Peterson and Pitz (1986) observed improvements in subjects= prediction performance on using a decision aid. Sharda, Barr and McDonnell (1988) found that use of a particular decision support system (DSS) resulted in significantly better decision-making performance and greater user confidence. Aldag and Power (1986) did not observe an improvement in decision quality with the use of the decision aid for subjects performing a short, unstructured task.

Decision aids are an important constituent of the audit environment (Messier 1995), with firms making increasingly large outlays towards their development. Several studies have investigated the effect of decision aids in

audit-related tasks. Butler (1985), for example, conducted a study to experimentally test a simple decision aid that helped to direct the decision-maker's attention to possibly underutilized information. He found that auditors who had access to the decision aid made risk assessments that were closer to the normative criterion than those who did not. Over a wide range of sampling risk, the aid was effective in leading to the correct audit decisions with regard to accepting or rejecting a reported account balance. Ashton (1992) examined the effect on judgment performance of an explicit justification requirement, and of having available the recommendations of a mechanical judgment aid. Both the justification requirement as well as the use of a mechanical aid were associated with a significant improvement in accuracy. The improvement in judgment performance was partly attributable to an increase in decision consistency. The benefit associated with the mechanical aid exceeded that associated with justification.

Other audit-related studies relating to the effectiveness of decision aids have drawn mixed results. Kachelmeier and Messier (1990) examined the effects of a decision aid provided in the AICPA's *Audit Sampling Audit Guide*, on the magnitude and variability of auditor sample size judgments. The decision aid led to systematically larger sample sizes than those elicited from unaided judgment, although there was evidence that suggested that decision aids may have both positive and negative effects. Ashton (1990) investigated the effects on decision making of three factors commonly found in audit settings: incentives, feedback, and justification. The study also examined the influence of decision aids on audit judgment, both individually and in combination with these factors. Results indicate that subjects provided with the decision aid performed significantly better than those who did not have the aid. However, the decision aid interacted with incentives, feedback and justification to have a deleterious effect on judgment performance.

Some evidence for the lack of consistency in observed results may be obtained from the Benbasat and Dexter (1982) study, which involved an experiment to assess whether decision aids could improve the performance of subjects with low analytical ability (low analytics) in task environments unsuited to their cognitive styles. The task environment consisted of a relatively structured inventory control/production scheduling system better suited for decision makers possessing high analytical abilities (high analytics). The decision aid used in the study was a simulation model. Results indicate that high analytics had a higher profit performance than low analytics, and low analytics with the decision aid performed better than those without the decision aid, suggesting that decision aids may benefit users differentially depending upon their individual cognitive styles.

### **Hypotheses**

While experience has been found to have a positive effect on decision performance in several studies (e.g., Bonner 1990; Frederick 1991), the evidence is not entirely consistent. Moeckel (1990), for example, found that auditors at all levels of experience are susceptible to a significantly high number of memory-related errors. That experienced auditors make errors of judgment is evident from the public disaffection following the collapses of several prominent companies that featured clean audit opinions in their most recent financial statements (Cormier et al. 1995).

A possible reason for auditors not achieving optimal decision performance may be the existence of rich information sets in the auditing environment. Libby and Libby (1989) suggest that humans have difficulty drawing inferences from multiple sources of information. This may be due to the dilution effect (Nisbett et al. 1981), the tendency of the decision maker to process information irrelevant to the decision task as though it were relevant. The dilution effect has been reported in auditing contexts as well (e.g., Hackenbrack 1992; Shelton 1999). The phenomenon is of great relevance in the modern-day environment characterized by quick and easy access to volumes of information, made possible by the unprecedented advances in telecommunication.

Personality variables are known to affect cognitive information processing (McGhee et al. 1978; Gul 1984). While it is conceivable that training may lead to a reduction in a decision-maker's susceptibility to the dilution effect (Gaeth and Shanteau 1984), the ability to discriminate between relevant and irrelevant information, *ceterus*

*paribus*, is a function of the decision-makers personality. An important personality variable that influences the decision-maker's ability to identify and discount irrelevant information is Machiavellianism (Geis 1978). Individuals who score high on Machiavellianism (high Machs) are able to focus more strongly on the elements relevant to the decision task at hand relative to low Machs, who tend to get distracted by irrelevant situational elements.

Machiavellianism, however, is related to the individual's ethicality (Christie and Geis 1970), which in turn is a function of the individual's level of cognitive moral development. The Kohlberg (1981) typology of cognitive moral development posits that an individual progresses through successive levels of moral attainment (preconventional, conventional, and postconventional) with the passage of time and the garnering of life experiences. Thus, younger individuals may be expected to be on a lower level of moral development as compared to someone more advanced in age and experience. Since an individual's orientation with respect to Machiavellianism is influenced by his or her cognitive moral development, it may also be expected to change in degree (from high to low) in tandem with the individual's progression through the stages of moral development. We posit that this effect may hold for auditors as well:

**H1A:** Novice auditors will score significantly higher on Machiavellianism than experienced auditors.

As stated above, the Kohlberg (1981) typology of cognitive moral development posits a gradual progression in an individual's level of cognitive moral development from preconventional to postconventional. However, while most mature adults attain the conventional stage, advancement to the postconventional stage entails the accumulation of a wider range of life experiences, possible only with the passage of a significant amount of time. Of the three hierarchical ranks examined in this study, partners may be expected to have the widest range of experience, followed by managers and then seniors. Thus, differences in Machiavellianism between novices and more experienced auditors are likely to be most pronounced between the least experienced group (i.e., seniors) and the most experienced group (i.e., partners) in the sample. Hypothesis H1B follows from this prediction:

**H1B:** Audit seniors will have significantly higher scores than partners.

High Machs concentrate on the elements relevant to the successful performance of the decision task (Geis 1978). Low Machs, on the other hand, are unable to clearly identify and discount the irrelevant information available during the performance of such tasks. We posit that in an audit task situation, low Machs will find more of the information provided to be relevant relative to high Machs. However, since novices are posited to be high Machs relative to experienced auditors, they will be better able to discriminate between relevant and irrelevant information than experienced auditors. In addition, since identification of relevant items depends on the individual's *perception* of that item as being relevant, high Machs are posited to perceive a significantly lower degree of relevance in the information provided than low Machs. This result is expected to hold even on controlling for differences in the degree of relevance of the information provided.

Decision aids constitute an important element in the audit environment (Messier 1995). Decision aids are believed to assist in decision-making by guiding the decision-maker to focus on the information cues relevant to the decision task at hand. However, we posit that novice auditors will outperform experience auditors in the identification of relevant information even on controlling for the availability of a decision aid.

The above intuition leads to the prediction that novice auditors will evidence significantly lower perceptions of information relevance than experienced auditors:

**H2A:** Controlling for information diagnosticity and decision aid availability, novice auditors will evidence significantly lower perceptions of information relevance than experienced auditors.

The Kohlberg (1981) typology of cognitive moral development suggests the existence of a gradual progression in an individual's level of cognitive moral development from pre-conventional to post-conventional. It has been hypothesized above that, as a result, differences in Machiavellianism are likely to be most pronounced between seniors and partners. Since high Machs are predicted to perform better in the identification of relevant information than low Machs, the widest differences in perceptions of information relevance are also expected to be evidenced between seniors (predicted to be high Machs) and partners (predicted to be low Machs). Hypothesis H2B follows from this analysis:

**H2B:** Controlling for information diagnosticity and decision aid availability, seniors will evidence significantly lower perceptions of information relevance than partners.

## METHOD

### Procedure and subjects

Auditors from both (then) Big 6 as well as non-Big 6 firms in the Montreal area participated in an experiment. Subjects provided their perceptions of the degree of relevance of the information provided in a case (Appendix 1) relating to a going concern judgment task (adapted from Cushing (1996) with minor variations<sup>1</sup>). Although the case was distributed by contact persons at each firm, they were requested to do so on a random basis. This was facilitated by a random distribution of the cases across each experimental condition prior to their delivery at each firm. Respondents were informed that their responses were confidential and would be aggregated for purposes of data analysis. Seventy usable responses were received (out of 140 sent, a response rate of approximately 46.6 per cent).

Subjects were required to possess at least three years of auditing experience. Participants included 18 partners (with an average of 226.0 months of auditing experience), 31 managers (with an average of 76.8 months of auditing experience), and 21 seniors (with an average of 44.6 months of auditing experience). Subjects' orientation with respect to Machiavellianism was measured using the Mach IV scale (Christie and Geis 1970). The instrument consists of 20 items in a standard-category Likert format (with Agree strongly being scored 7, no answer 4, and Disagree strongly 1). The scale is widely considered to be a model of careful construction and validation (Robinson et al., 1991). Higher scores indicate a higher degree of Machiavellianism.

The instrument was pretested by conducting a pilot study with graduate level accounting students preparing for the Uniform Final Examinations (UFE) of the Canadian Institute of Chartered Accountants (CICA). 81 students participated voluntarily in the pilot study, acting as surrogates for auditing professionals in carrying out the decision task. Assignment of students to each of the four treatment groups was done on a random basis. Students were also requested to indicate to the researcher whether they experienced any problems arising due to ambiguity, incomprehensibility, redundancy or any other factor. Overall, the material was found to be free from confusing or ambiguous information. However, some cosmetic improvements relating to design were suggested and incorporated in the test instrument subsequently distributed to audit firms<sup>2</sup>.

---

<sup>1</sup>Modifications made to the case included the deletion of the introductory and closing paragraphs (relating to the personnel of the Genesis Investment Fund), changing names used in the case, changing the dates (to reflect greater recency), and re-arranging the information under new sub-headings.

<sup>2</sup>An example is the placement of the page featuring the decision aid before the case material pages (instead of after).

### **Experimental task**

Information diagnosticity and decision aid availability were manipulated in a 2x2 between-subjects research design. Subjects were assigned randomly to an experimental condition and were asked to assume the role of the audit partner for the current year's engagement of an auditee firm. Information on the firm was provided to them in the form of a case (adapted from Cushing 1996). Subjects were asked to judge how much of the information provided to them was relevant to determining the going-concern ability of the firm. They were asked to indicate their perceptions of the relevance of the given information to the going-concern assessment task from 0 ("None of it was relevant") to 10 ("All of it was relevant").

Subjects were also asked to respond to the 20 items on the Christie and Geis (1970) Mach IV scale in order to determine their orientation with respect to Machiavellianism. Demographic information pertaining to each subject was also collected.

### **Independent variables**

Participants were assigned randomly to one of four treatment groups. Information diagnosticity was manipulated at two levels: diagnostic information only and mixed (diagnostic as well as nondiagnostic) information. The manipulation was carried out as follows. Cases with diagnostic information only had information extracted solely from the original case itself. This included the history and background of the company, its consolidated balance sheet for the current and previous year, consolidated income statements for the current and two preceding years, consolidated statements of cash flows for the current and two preceding years, notes 6, 9 and 10 to the financial statements, and an analysis of the company's financial performance and financial position during the current year. This last piece of information was presented as an excerpt from the audit working papers of the senior in charge of the audit engagement relating to the client firm described in the case.

Nondiagnostic information totally unrelated to the original case was added to the diagnostic information described above in order to achieve the mixed information manipulation. This included note 1 to the consolidated financial statements<sup>3</sup>; information on the company's policies relating to personnel development, job rotation and the affirmation of commitment to the company's mission; the establishment of an audit committee and a good working relationship between the company and its auditors; and finally, the socially responsible activities of the company's Chief Executive Officer.

Decision aid availability was manipulated at two levels: with or without the decision aid. The decision aid itself was of the decomposition variety, allowing users to break up the information relating to the case into distinct components classified under separate categories such as operational, financial and environmental factors. The development of the aid was based on a review of the financial distress literature.

The third independent variable was auditor experience. This was proxied by subjects' ranks within their firms. Subjects were also asked to indicate their overall experience in auditing (measured in months).

### **Dependent variable**

The dependent variables in the study were subjects' perceptions of information relevance and their orientations with respect to Machiavellianism. Subjects' perceptions of information relevance were measured on a Likert-type scale from 0 ("None of it was relevant") to 10 ("All of it was relevant"). Subjects' orientation with respect to Machiavellianism was measured using the Christie and Geis (1970) Mach IV scale. Based on their scores, subjects were either classified as high Machs or low Machs depending upon whether their scores were higher or lower than the mean Mach score for the entire sample.

## **RESULTS**

### **Manipulation checks**

---

<sup>3</sup>We are grateful to Prof. Cushing for making a suggestion relating to this note.

To verify the information diagnosticity manipulation, a panel of experienced judges was polled on the degree of relevance of each item of information included in the case. Each unique item of information in the case was numbered sequentially. Four judges with a mean experience in auditing of nine years as either partners or managers, and some experience in going concern assessments and reporting decisions (resulting in a total of ten going concern opinions among them), agreed to volunteer. The judges were presented with a version of the case that had all items of information serially numbered, and were asked for their opinions on the degree of relevance of each numbered item to going-concern assessment. They indicated their responses separately for each numbered item on a scale from 0 ("Not at all relevant") to 10 ("Completely relevant").

The responses of all the judges were compared with each other in order to determine the degree of consensus achieved. In general, diagnostic and non-diagnostic items were unanimously perceived as such by the judges, with the exception of only two items: the history and background of the firm, and the firm's plan to gain market share. Although the former was originally introduced into the case as a relevant item of information, there was inter-judge disagreement on this item, with two judges considering it decidedly irrelevant, one undecided, and one decidedly relevant. In view of the lack of inter-judge consensus, as well as the necessity of incorporating some introductory material designed to provide a measure of orientation to the subjects, the item was retained without any modifications in the final version of the case.

The other item of information on which there was a lack of inter-judge consensus (relating to the company's plans to boost market share) was originally introduced into the case as an irrelevant piece of information. However, it was deemed relevant by three of the judges, with one remaining undecided. Follow-up interviews with the dissenting judges elicited their reasons for considering this information as relevant. Consequently, in response to their concerns, the item was modified to eliminate any information that could be perceived as relevant. Figure 1 presents the original and modified versions of this piece of information. An overview of the judges' opinions on the relevance of each information item relative to their original characterization in the study is presented in Table 1.

Insert Figure 1 here

Insert Table 1 here

The validity of using subjects' ranks within their firms as a proxy for experience was tested using correlational analysis. Table 2 presents the results of this analysis.

Insert Table 2 here

There is a significant correlation between position within the firm and overall auditing experience. This is only to be expected, since auditors' movement up the corporate ladder is based to a large extent on the length of their auditing experience. We carried out subsequent analyses using both position within the firm and length of auditing experience as independent variables, but since the results were similar, we report here only the results observed using an individual's rank as the independent variable.

### **Tests of hypothesis**

A univariate analysis of variance (ANOVA) technique was used to compare subjects on their Mach scores in order to test H1A, which predicts that novice auditors will have significantly higher Mach scores than experienced auditors. Panel A in Table 3 presents the descriptive statistics relating to subjects' mean scores obtained on the Mach IV scale (MACHSCOR). Partners have a mean MACHSCOR of 3.1304 (n=18), while managers have a mean MACHSCOR of 3.3355 (n=31) and seniors have a mean MACHSCOR of 3.6095 (n=21).

Insert Table 3 here

Panel B of Table 3 reports a summary of the one-way ANOVA with subjects' position within the firm (RANK) as the independent variable. Although Panel A indicates that the mean scores are in the hypothesized

direction, the results of the ANOVA do not indicate any significant differences in MACHSCOR among the three ranks ( $F_{2,67} = 1.969, p = .148$ ). H1A is therefore not supported.

H1B predicted that seniors would have significantly higher MACHSCOR=s than partners. Panel C of Table 3 presents the results of the ANOVA carried out to test this hypothesis. There is a significant difference between the MACHSCOR=s of seniors and partners at conventional levels of significance ( $F_{1,37} = 3.135, p = .085$ ). H1B is thus supported.

H2A predicts that novice auditors will evidence significantly lower perceptions of information relevance than experienced auditors. This result is predicted to hold even on controlling for differences in the diagnosticity of the information available, and the availability of a decision aid. Table 4 presents the results of the analysis pertaining to this hypothesis.

Insert Table 4 here

Panel A, Table 4 presents the descriptive statistics relating to subjects= perceptions of information relevance (RELEVNS). The results are in the hypothesized direction. Across the four treatment groups, partners= mean perception of the relevance of the information provided was 7.324. The mean value of RELEVNS for managers was 6.350, while that for seniors was 5.762.

In order to test for statistical significance in the difference in RELEVNS among the three ranks, a one-way ANOVA was carried out. Panel B of Table 4 presents the summary of this analysis. Results indicate that H2A is supported ( $F_{2,65} = 3.417, p = .039$ ).

Since H2B predicts a significant difference in the perceptions of information relevance of seniors relative to partners, a further analysis was carried out to pinpoint the source of the difference observed in Panel B of Table 4. Table 5 presents the results of this analysis.

Insert Table 5 here

Panel A of Table 5 displays the ANOVA summary for RELEVNS with partners and seniors only included in the analysis. Panel B displays the results of the analysis carried out with only managers and seniors being included. As may be observed from Panel A, there is a significant difference in the mean perceptions of partners versus seniors with respect to perceptions of information relevance ( $F_{1,36} = 7.479, p = .010$ ). Panel B indicates no significant differences in perceptions of information relevance of managers relative to seniors ( $F_{1,49} = 1.207, p = .277$ ). H2B is thus supported. These results are consistent with those observed for H1B.

## DISCUSSION

### Summary, implications, and suggestions for further research

This study examined whether Machiavellianism in auditors is related to their experience. If yes, does this affect their ability to discriminate between relevant and irrelevant information? Does this effect remain stable on controlling for differences in the level of diagnosticity of the information available and the availability of a decision aid?

Although most prior studies on the effect of experience on auditor judgment (with the notable exception of Moeckel 1990) report experience-related improvements in auditor decision-making, this study finds evidence that is inconsistent with this result. Specifically, less experienced auditors are found to be more capable of discriminating between relevant and irrelevant information than more experienced auditors. This finding is more pronounced for auditors at each extreme of the experience spectrum examined in this study (i.e., seniors and partners).

The results may be explained within the framework of the effect of individual personality variables on cognitive information processing (McGhee et al. 1978; Gul 1984) in conjunction with Kohlberg=s (1981) typology of cognitive moral development. This study examines a personality variable found to have influenced individuals= ability to distinguish between relevant and irrelevant informationC Machiavellianism. While acknowledging that

individual personality variables affect cognitive information processing ability, researchers have long recognized their unstable nature and tendency to adapt to environmental states (Pratt 1980). This is consistent with the Kohlberg (1981) typology of cognitive moral development which posits that individuals evolve with respect to their level of cognitive moral development, successively attaining yet higher levels of morality (and ethicality) with the passage of time and the gathering of life experiences. An individual's Machiavellianism is subsumed within the rubric of moral development. Whether it experiences a decrease in intensity as the individual gains greater life (as also work-related) experiences is an important empirical question.

This study finds preliminary evidence supporting such an evolution. Specifically, less experienced auditors were found to be significantly higher on Machiavellianism than more experienced auditors. Again, this finding was most marked for auditors at either end of the experience scale, i.e., seniors and partners. This result suggests that while partners may have acquired enough experience to attain the postconventional level of moral development, managers and seniors are still at the conventional level as a result of their lesser experience (albeit with managers slightly more evolved than auditors).

While this finding may be positive when viewed through the perspective of moral development and auditors' sensitivity to ethical situations (cf. Mautz and Sharaf 1961), it is cause for concern when viewed through the perspective of decision performance. Most of the crucial decisions relating to an audit engagement are made by the most experienced members of the audit team, typically partners or managers with extensive experience. While they may be expected to be low Machs, our findings suggest that it would not be unreasonable to expect them to be less than impervious to the dilution effect. This may even lead to sub-optimal decisions with possible costly consequences for the firm.

Further research needs to be done, however, before any assertions can be conclusively made about the relationship between the dilution effect, experience, and Machiavellianism in an auditing setting. This could take the form of replication of this study with other subjects in other geographical locations. This study provided subjects with information relevant to the going-concern decision. Varying the task (or its degree of structuredness) would provide additional insights into the ability of auditors to pinpoint relevant information. Future studies could also focus on the effect of the auditor's Mach score on his or her decision performance, and whether individual effects could be obviated through factors such as training or group decision-making.

### **Limitations**

The study is subject to some limitations. The results of the study are not generalizable to the population as a whole primarily because of the relatively small number of participants as well as the focus on a particular geographical area. The study used a between-subjects design, but a longitudinal study may have been better able to track any evolution in subjects' Machiavellianism over time. Subjects were asked to provide their perceptions of information relevance as a measure of their ability to identify and discount irrelevant information. While this may be an acceptable surrogate given the current state of behavioral accounting research, a more concrete way of measuring the aforesaid ability would have greatly benefitted this study.

Despite these limitations, this study presents some useful preliminary evidence on the relationship between experience, Machiavellianism, and the dilution effect, and indicates the need to consider this evidence while forming decision-making teams during audit engagements.

## REFERENCES

- Abdolmohammadi, M.J. 1987. Decision support and expert systems in auditing: A review and research directions. *Accounting and Business Research* (Spring 1987):72-185.
- \_\_\_\_\_, and A. Wright. 1987. An examination of the effects of experience and task complexity on audit judgments. *The Accounting Review* (January 1987):1-13.
- Aldag, R.J., and D.J. Power. 1986. An empirical assessment of computer-assisted decision analysis. *Decision Sciences* 17:572-588.
- Ashton, A.H. 1991. Experience and error frequency knowledge as potential determinants of audit expertise. *The Accounting Review* 66:218-239.
- Ashton, R.H. 1974. An experimental study of internal control judgments. *Journal of Accounting Research* 12:143-157.
- \_\_\_\_\_, 1990. Pressure and Performance in accounting decision settings: paradoxical effects of incentives, feedback, and justification. *Journal of Accounting Research Supplement* 20:148-180.
- \_\_\_\_\_, 1992. Effects of justification and a mechanical aid on judgment performance. *Organizational Behavior and Human Decision Processes* 52:292-306.
- Benbasat, I., and A.S. Dexter. 1982. Individual differences in the use of decision support aids. *Journal of Accounting Research* 20 (1):1-11.
- Bonner, S.E. 1990. Experience effects in auditing: The role of task-specific knowledge. *The Accounting Review* 65:72-92.
- Brown, E.B., and I. Solomon. 1991. Configural information processing in auditing: The role of domain-specific knowledge. *The Accounting Review* 66:100-119.
- Butler, S.A. 1985. Application of a decision aid in the judgmental evaluation of substantive test of details samples. *Journal of Accounting Research* 23:513-526.
- Calhoun, R.P. 1969. Niccolo Machiavelli and the twentieth century administrator. *Academy of Management Journal* 12 (2):205-212.
- Castellan, M.J. 1973. Multiple cue probability learning with irrelevant cues. *Organizational Behavior and Human Performance* 9:16-29.
- Christie, R., and F.L. Geis. 1970. *Studies in Machiavellianism*. New York: Academic Press.

Cormier, D., M. Magnan, and B. Morard. 1995. The auditor=s consideration of the going concern assumption: A diagnostic model. *Journal of Accounting, Auditing, and Finance* 10 (2): 201-222.

Cushing, B.E. 1996. Prime Motor Inns. *Journal of Accounting Case Research* 3 (2):89-96.

- Frederick, D.M. 1991. Auditors= representation and retrieval of internal control knowledge. *The Accounting Review* 66:240-258.
- \_\_\_\_\_, and R. Libby. 1986. Expertise and auditors= judgments of conjunctive events. *Journal of Accounting Research* 24:270-290.
- Gaeth, G.J., and J. Shanteau. 1984. Reducing the influence of irrelevant information on experienced decision makers. *Organizational Behavior and Human Performance* 33:263-282.
- Geis, F.L. 1978. Machiavellianism. In *Dimensions of Personality*, H. London and J.E. Exner, Jr. (eds.). New York: John Wiley and Sons.
- Gul, F.A. 1984. The joint and moderating role of personality and cognitive style on decision making. *The Accounting Review* (April 1984):264-277.
- Hackenbrack, K. 1992. Implications of seemingly irrelevant evidence in audit judgment. *Journal of Accounting Research* 30:126-136.
- Hunt, S.D., and L.B. Chonko. 1984. Marketing and Machiavellianism. *Journal of Marketing* 48 (3): 30-42.
- \_\_\_\_\_, and S.J. Vitell. 1993. The general theory of marketing ethics: A retrospective and revision. In *Ethics in Marketing*, N.C. Smith and J.A. Quelch (eds.). Homewood, IL: Irwin Inc.
- Ibrahim, M., and A. Shome. 1998. Effects of decision aid use and information abundance on auditors= judgment performance. *Asian Journal of Business and Information Systems* 3 (1):79-101.
- Kachelmeier, S.J., and W.F. Messier. 1990. An investigation of the influence of a nonstatistical decision aid on auditor sample size decisions. *The Accounting Review* 65:209-226.
- Keen, P.G.W., and M.S. Scott-Morton. 1978. *Decision Support Systems: An Organizational Perspective*. Reading, MA: Addison-Wesley.
- Kohlberg, L. 1981. *Essays in Moral Development: the Philosophy of Moral Development*. New York: Harper and Row.
- Libby, R., and D.M. Frederick. 1990. Experience and the ability to explain audit findings. *Journal of Accounting Research* 28 (2):349-367.
- \_\_\_\_\_, and P.A. Libby. 1989. Expert measurement and mechanical combination in control reliance decisions. *The Accounting Review* 64:729-747.
- Mautz, R.K., and H.A. Sharaf. 1961. *The Philosophy of Auditing*. Chicago: AAA.

- McGhee, W., M.D. Shields, and J.G. Birnberg. 1978. The effects of personality on a subject's information processing. *The Accounting Review* (July 1978):681-697.
- Messier, Jr., W.F. 1995. Research in and development of audit decision aids. In R.H. Ashton and A.H. Ashton (Eds.), *Judgment and Decision-Making Research in Accounting and Auditing*, 207-228. Cambridge, UK: Cambridge University Press.
- Moeckel, C. 1990. The effect of experience on auditors' memory errors. *Journal of Accounting Research* 28 (2):369-387.
- Nisbett, R.E., H. Zukier, and R.E. Lemley. 1981. The dilution effect: Nondiagnostic information weakens the implications of diagnostic information. *Cognitive Psychology* 13:248-277.
- Peterson, D.K. and G.F. Pitz. 1986. Effect of input from a mechanical model on clinical judgment. *Journal of Applied Psychology* 71:163-167.
- Pratt, J. 1980. The effects of personality on a subject's information processing: A comment. *The Accounting Review* (July 1980):501-510.
- Rawwas, M.Y.A., and A. Singhapakdi. 1998. Do consumers' ethical beliefs vary with age? A substantiation of Kohlberg's typology in marketing. *Journal of Marketing Theory and Practice* 6 (2): 26-38.
- Robinson, J.P., P.R. Shaver and L.S. Wrightsman. 1991. *Measures of Personality and Social Psychological Attitudes*. New York: Academic Press.
- Sharda, R., S.H. Barr, and J.C. McDonnell. 1988. Decision support system effectiveness: A review and an empirical test. *Management Science* 34:139-159.
- Shelton, S.W. 1994. The effect of nondiagnostic evidence and accountability on auditor judgment. Ph.D. Dissertation, University of Wisconsin-Madison.
- \_\_\_\_\_, 1999. The effect of experience on the use of irrelevant evidence in auditor judgment. *The Accounting Review* 74 (2):217-224.
- Solomon, I., and M.D. Shields. 1995. Judgment and decision-making research in auditing. In R.H. Ashton and A.H. Ashton (Eds.), *Judgment and Decision-Making Research in Accounting and Auditing*, 137-175. Cambridge, UK: Cambridge University Press.
- Troutman, C.M., and J. Shanteau. 1977. Inferences based on nondiagnostic information. *Organizational Behavior and Human Performance* 19:43-55.
- Vleeming, R.G. 1979. Machiavellianism: A preliminary view. *Psychological Reports* 44 (February): 295-310.

**Figure 1**  
Original and modified versions of market share plans

**Original version of the company=s plans to boost market share:**

However, under the leadership of the company=s recently appointed Chief Executive Officer, Mr. Mike Totsis, the company has effected several programs in order to boost market share in the short term, and achieve market leadership in the long term. These programs include:

14. C enhanced personnel development programs
15. C job rotation at the middle and lower management levels
16. C aggressive recruitment of personnel with proven track records in marketing
17. C company-wide affirmation of commitment to the company's mission

**Revised version of the company=s plans to boost market share:**

However, under the leadership of the company=s Chief Executive Officer, Mr. Mike Totsis, the company has effected several programs in order to change the status quo. These programs are:

- ☞ enhanced personnel development programs
- ☞ job rotation at the middle and lower management levels
- ☞ company-wide affirmation of commitment to the company's mission.

**TABLE 1**

Results of comparison of pretest judges= perceptions with the original categorization of the study relating to relevance of different information items used in the case

Case section	Originally perceived as	Judges= perception	Action taken
History and background	relevant	irrelevant	Retained
Consolidated balance sheet	relevant	relevant	Retained
Consolidated income statement	relevant	relevant	Retained
Consolidated cash flow st.	relevant	relevant	Retained
Note 1 to financial statements	irrelevant	irrelevant	Retained
Note 6 to financial statements	relevant	relevant	Retained
Note 9 to financial statements	relevant	relevant	Retained
Note 10 to financial statements	relevant	relevant	Retained
Market perspective	relevant	relevant	Retained
Program for market share gain	irrelevant	relevant	Modified
Enhanced personnel development	irrelevant	irrelevant	Retained
Job rotation	irrelevant	irrelevant	Retained
Recruitment	irrelevant	irrelevant	Retained
Commitment to company mission	irrelevant	irrelevant	Retained
Financial position	relevant	relevant	Retained
Results of operations	relevant	relevant	Retained
Statement of cash flows	relevant	relevant	Retained
Entire AResults of operations@	relevant	relevant	Retained

**TABLE 2**

**Correlation between position in the firm (RANK) and length of audit experience.**

Test	Correlation coefficient	Significance (2-tailed)
Pearson Correlation	-.785**	.000
Kendall=s Tau	-.716**	.000
Spearman=s Rho	-.835**	.000

\*\* Correlation is significant at the 0.01 level (2-tailed).

**TABLE 3****Panel A: Means, standard deviations, and cell sizes for MACHSCOR, full sample, by RANK**

	<b>RANK</b>		
	<b>Partners</b>	<b>Managers</b>	<b>Seniors</b>
Mean	3.1304	3.3355	3.6095
Standard deviation	0.7343	0.6436	0.9245
Cell size	18	31	21

**Panel B: Summary ANOVA table for MACHSCOR, full sample, by RANK**

Main effect	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Significance of F</b>
Between Groups	2	1.137		
Within Groups	67	.577	1.969	.148

**Panel C: Summary ANOVA table for MACHSCOR, partners and seniors only, by RANK**

Main effect	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Significance of F</b>
Between Groups	1	2.225		
Within Groups	37	0.710	3.135	.085

**TABLE 4****Panel A: Means, standard deviations, and cell sizes for RELEVNS, full sample, by RANK\***

	RANK		
	Partners	Managers	Seniors
Mean	7.324	6.350	5.762
Standard deviation	1.704	1.944	1.786
Cell size	17	30	21

\* Two cases were dropped due to missing values

**Panel B: Summary ANOVA table for RELEVNS, full sample, by RANK**

Main effect	df	Mean Square	F	Significance of F
Between Groups	2	11.558		
Within Groups	65	3.382	3.417	.039

**TABLE 5****Panel A: Summary ANOVA table for RELEVNS by RANKCPartners vs. seniors**

Main effect	df	Mean Square	F	Significance of F
Between Groups	1	22.911		
Within Groups	36	3.063	7.479	.010

**Panel B: Summary ANOVA table for RELEVNS by RANKCManagers vs. seniors**

Main effect	df	Mean Square	F	Significance of F
Between Groups	1	4.272		
Within Groups	49	3.538	1.207	.277