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The Effects of Contexts and Cognitive Characteristics on Accounting Information Processing: A Review of Behavioral Accounting and Cognitive Psychology Research

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ABSTRACT

The paper reviews influential literature concerning the effect of the contextual environment of decisions and the cognitive characteristics on accounting information processing and decision-making. The contextual environment of a decision might have the following effects on an accounting decision: information, salience, motivation, and memory-coding effects. These effects influence the judgment of individual accountants and auditors in their decision-making. On the other hand, the cognitive characteristics of individual accountants also affect their decision-making process, by affecting their knowledge and information processing activities. Cognitive characteristics can be divided into three main categories: cognitive styles, cognitive abilities, and cognitive strategies (the interaction between cognitive styles and cognitive abilities). Some interaction may be seen between contextual effects and cognitive characteristics that amplify the total effect on the accounting decision maker. Behavioral accounting studies that show the effects of these contextual factors and cognitive characteristics on accounting decision makers are mentioned.

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INTRODUCTION

Behavioral and cognitive research is a growing area within the accounting field. Research in this area is aimed at understanding individual mental processes, cognitive characteristics, and features that influence accounting judgments and decisions. Mental processes have a profound effect on judgment and decision-making in accounting. Accountants (including auditors) use subjective evaluations and environmental cues to help them make a variety of technical decisions. Such decisions involve estimates, sampling, audit-related verifications, reconciliations, projections, and costing, among others. The impact of these decisions on an organization's survival and success is significant, because they entail enormous financial (and other) consequences.

The contextual environment of accounting refers to the specific circumstances of an accounting decision. The detail involved in describing tasks to accountants and the existence of cues in the environment in which accounting decisions take place are examples of the effect of the contextual environment on accounting decision-making.

In the past decade, a trend has emerged in behavioral accounting research that involves cognitive characteristics when investigating decision makers' knowledge acquisition and judgment performance. Bonner and Lewis (1990) report that cognitive characteristics (e.g., natural ability and knowledge) can better explain differences in performance between experienced and inexperienced auditors than experience. Early accounting studies on cognitive characteristics examined the usefulness of accounting information, but were empirically inconsistent in their

findings of the relationships between cognitive characteristics and decision performance. Researchers have attributed these inconsistencies partly to several causes, e.g., the use of inadequately validated measurement instruments (Ho and Rodgers, 1993).

The purpose of this paper is to review influential research articles in the literature concerned with the effect of contexts and cognitive characteristics on accounting decision-making. Several articles relating to cognitive psychology and behavioral accounting research are reviewed in this paper. The objective of the review is to summarize key contextual and cognitive factors that affect the decision-making process of accountants. The paper starts by examining the role of context in accounting decision-making. Next, the paper investigates the role of cognitive characteristics. The integrated model is shown in the last section of the paper, summarizing the conclusions of this research and the implications and future research.

CONTEXTS AND ACCOUNTING DECISIONS

Haynes and Kachelmeier (1998) claim that the institutional environment of accounting decisions has two dimensions: the task environment (what accounting decision makers do) and the contextual environment (how accounting tasks are described). The importance of context comes from the argument that differences in context can lead to different judgments regarding the same decision. Haynes and Kachelmeier (1998) give an example where a decision of evaluating materiality is to be made in a particular audit engagement. If the decision was taken in the more institutionally rich context of assessing whether there is an excessive likelihood of material misstatement in audited financial statements, the negative repercussions associated with undetected material misstatement could lead to a more conservative judgment than if lower such likelihood is perceived.

Haynes and Kachelmeier (1998) assert that context can provide new or clearer cues that are relevant to the task (information effects), direct differential attention among existing cues (salience effects), highlight decision consequences (motivation effects), and draw upon the decision maker's expertise (memory-coding effects).

Information Effects

The foremost effect of contextually rich setting on judgments is through providing information useful for accomplishing the task (Haynes and Kachelmeier, 1998). Hampson and Morris (1996) review several studies by psychology researchers who argue that the use of real-world contexts (e.g., pictures of natural settings, recall of meaningful sentences) provides the requisite informational cues appropriate to the task, and facilitates understanding and task optimization. Information effects can occur from adding new cues or from clarifying ambiguous meaning.

Adding new cues. Several studies have documented the effect of accounting context through adding new cues that can be used by the decision maker to achieve the task objective. However, Haynes and Kachelmeier (1998) state that the information cues can also have a negative effect, through adding to the contextual complexity of a decision. Contextual complexity can arise when the phenomena of information overload and outcome knowledge take place; it can also take place when irrelevant cues are given. Information overload takes place when more information cues are given than can be processed by a decision maker, thus overwhelming his or her processing ability. Outcome knowledge (also called hindsight bias), another cause of complexity, refers to the effect of knowing an event's outcome in hindering the ability to form unbiased unconditional judgments as if the outcome were unknown. Irrelevant cues added to the decision context can also mislead decision makers.

Clarifying meaning. Haynes and Kachelmeier (1998) claim that in addition to adding new cues, contextual richness can provide clearer information. Accounting literature offers limited evidence on the ability of context to clarify meaning. An experiment by Wartick, Madeo, and Vines (1997) found that the use of tax terminology in a tax compliance task led to income reporting rates approximately twice that in a neutral, nontax terminology setting.

Saliency Effects

According to Haynes and Kachelmeier (1998), accounting contexts can direct differential attention among existing cues, as well as provide new or clearer cues. This effect is called saliency effect, with "saliency" referring to contextual emphasis rather than clarity. Contextual variations can enhance saliency in several ways, including: (1) natural focal points (a decision maker's natural focus among ostensibly arbitrary alternatives), (2) unusual or surprising features, and (3) saliency induced by emphasis in contextual materials. Although the accounting literature has examined the effect of unusual features and saliency induced by emphasis in contextual materials, it has not seriously examined the effects of natural focal points.

Some accounting studies have examined "manufactured" (rather than natural) saliency that redirects the decision-maker's attention toward specific aspects of the task environment. Such manufactured saliency was termed "decision aids" in accounting and auditing, and they focus the decision maker's attention on certain aspects of the task environment. Bonner, Libby, and Nelson (1996) found that providing a decision aid that decomposed the estimation of conditional probabilities into assessments of individual error probabilities significantly improved auditors' conditional probability judgments. This particular aspect of the contextual environment is relevant to accounting because accounting is mainly a tool for information communication and the ability of alternative forms of communication to direct differential attention among decision cues is of particular importance to many accounting controversies (Haynes and Kachelmeier, 1998).

Motivation Effects

According to Haynes and Kachelmeier (1998), context can increase motivational awareness by suggesting possible consequences of the decision that would not be apparent in a more abstract setting. These consequences can motivate the decision maker into using different judgments and decisions than would be made otherwise. Accounting literature includes many studies that have focused on the potential adverse consequences associated with erroneous judgments. Auditors face severe legal and reputational consequences from audit failures. Studies by Solomon, Ariyo, and Tomazzini (1985) illustrate how changes in context can influence motivation and behavior of auditors.

Within their discussion of conceptual motivation effects, Haynes and Kachelmeier (1998) point out to the concept of "framing effects", the tendency of individuals to desire gains and be averse to losses. While intuition would support the argument behind the concept, researchers claim that this argument increases in importance when economic

problems involving choice are framed as either a gain or a loss relative to a contextual reference point. The accounting literature has used the concept of framing effects in several applications. Two managerial accounting studies illustrate the framing effect. Kim (1992) investigated budgetary decisions and found that the subjects were more likely to favor a tight but risky budget when contextual materials involved an unfavorable initial reference point. Lipe (1993) found that, in investigating variance figures, evaluations were more favorable when the investigation was framed as a beneficial cost than as a loss. The results of these two studies show the relative nature of perception in an accounting setting when motivation is involved.

Accountability is another important construct that is particularly relevant to accounting decision makers (Haynes and Kachelmeier, 1998), because they emphasize the establishment and valuation of accountability for individual managers. Gibbins and Newton (1994) believe that responses to accountability can be grouped as follows: (1) shifts in attitude toward the position of the party to which one is accountable, (2) defensiveness, and (3) increased cognitive effort. In general, accountability is one of the most researched topics in behavioral accounting. Hoffmann and Patton (1997) found a strong support for the association of accountability with more conservative auditor judgments.

Studies have shown that accountability has the effect of making decision makers more cautious in explaining their positions. These studies provide evidence that accountability is an important construct to accounting practitioners, because of the significant financial consequences of their decisions. Accountability, thus, acts as a strong motivator towards more conservatism, which became a typical accountants' characteristic.

Memory-Coding Effects

Knowledge stored in and retrieved from memory is also affected by the context. Because contexts interact with the decision maker's knowledge structures, it can influence his or her behavior by triggering different stereotypes, categorizations, roles, schemata, and scripts (Haynes and Kachelmeier, 1998). The effect of context on knowledge and behavior has been abundantly researched in behavioral accounting studies. Researchers argue that experience does not necessarily imply expertise, but, if it interacts with features of the task or context that draw's upon knowledge, it can be used as a measure of knowledge gained over time. Accounting researchers call this the expertise paradigm (Libby, 1995). Libby (1995) suggests that there are many situations in which context and experience can not influence behavior in their own right, but the combination of context with experience enables the more experienced decision maker to draw upon knowledge structures encoded in memory, provoked by the context.

It is also believed that contextual richness that map into the decision maker's expertise can improve judgments can lead to unfavorable consequences. Marchant, Robinson, Anderson, and Schadewald (1991) found that introductory tax students outperformed tax professionals in applying knowledge to new, but familiar, tax situations. The above studies show that the effect of memory coding is significant on decision makers' behavior, through the context of the decision.

COGNITIVE CHARACTERISTICS AND ACCOUNTING DECISION-MAKING

Early accounting research has shown empirical inconsistencies in its findings of the relationship between cognitive characteristics and decision performance. According to Ho and Rodgers (1993), the reason behind these inconsistencies is "the use of inadequately validated measurement instruments". While researchers have been studying cognitive abilities (abilities to accumulate and process accounting information), they were claiming that the performance of decision makers is influenced by "cognitive styles", when it is actually affected by cognitive ability. Based on this possible explanation, Ho and Rodgers (1993) use Kogan's (1973) taxonomy as a theoretical framework to separate decision makers' cognitive characteristics into three primary compo-

nents: cognitive styles, cognitive abilities, and cognitive strategies. The following subsections present Kogan's taxonomy and related cognitive psychology research, and then attempts to relate relevant accounting studies according to the taxonomy.

Cognitive Styles

Kogan (1973) defines cognitive styles as the distinctive ways of acquiring, storing, retrieving, and transforming information. Styles are trait variables, rarely changing over time, such as attitudes and preferences. Jung (1923) attempts to describe how decision makers perceive information for analyzing two psychological functions, detail-types (a macroconcept relating to bottom-up processing) and global-types (a macroconcept relating to top-down processing). Detail-type decision makers prefer to analyze isolated, concrete details, whereas global-types focus of relationships. Empirical research has shown that one type is more effective than the other in a particular task, e.g. global-types are better in predicting.

Mason and Mitroff (1973) used Jung's (1923) typology to suggest that individuals differ along two basic dimensions, perception and judgment. In the perception dimension, at one extreme are sensation-oriented (detail-type) individuals, while at the other extreme are intuitive-oriented (global-type) individuals. Intuitive individuals perceive problems as a while and dislike routine. Sensing individuals prefer detailed, structural problems and prefer routine work. Differences in individuals' cognitive styles thus may result in different preferences for information. In the judgment dimension, at one extreme is the thinking individual, who tends to be very impersonal in the evaluation and generalizes from a logic base. At the other extreme is the feeling individual who takes into account individual feelings and seeks to understand personalities affected by the decision. Hence, individuals with different cognitive styles may make different choices and decisions (Ho and Rodgers, 1993).

Behavioral research in accounting related to cognitive styles attempts to examine how a decision maker's perception and use of information affects his or her financial information processing. Blaylock and Rees (1984) asked 50 MBA students to rank the provided information in order of its usefulness. Subjects were distinguished into global-types (intuitive thinkers and feelers) and detail-types (sensing thinkers and feelers). The authors found that the global-types and the detail-types perceived sets of information differently. Consistent with predictions of cognitive style theory, feelers considered information containing worker and community five times more useful than thinkers. Also, perceptions of different sets of information varied dynamically according to feedback incorporated into the decision-making process.

Cognitive Abilities

Kogan (1973) defines cognitive abilities as knowledge encoding and retrieval. Abilities are concerned with level of skill and are situational variables, changing throughout a person's lifetime, e.g., when an individual's ability to solve puzzles improves by practice. Research on cognitive abilities examines what information a decision maker selects, by what operation, and in what form (Glass and Holyoak, 1986).

Awasthi and Pratt (1990) investigated the role of decision makers' cognitive ability (e.g., perceptual differentiation) by testing the effectiveness of monetary incentives on decision performance. The authors found that monetary incentives improved the performance of individuals with high perceptual differentiation but did not improve the performance of those with low perceptual differentiation. Results suggest that monetary incentives can induce subjects to exert more effort, but cognitive ability is necessary for improving decision makers' performance.

Cognitive Strategies

Kogan (1973) defines cognitive strategies as the ongoing interactions among an individual's cognitive styles, cognitive abilities, and the environment. They are affected by task requirements, situational

constraints, and problem contents. Kogan used the notion of cognitive complexity to help explain cognitive strategies because the cognitively complex individual differentiates his or her personal world to a greater extent than does the cognitively simple individual. The amount of information an individual can differentiate may affect his or her information processing strategies, that is, the ways information is processed, what information is looked at, and subsequent judgments.

Ho and Rodgers (1993) state that research on cognitive strategies focuses on how finely people discriminate information or to what extent they differentiate data. Cognitive strategies represent the component of cognitive characteristics that interacts with the context in a decision-making setting. Individuals' cognitive strategies are influenced by their expertise in the context. Gul (1984) examined the interaction effect of cognitive ability and cognitive strategy on managers' decision confidence when evaluating human resource accounting. Forty-six managers from a cross-section of electronic companies in Malaysia participated in the experiment. Results provided preliminary support for the hypothesis that cognitive ability and cognitive strategy interact to moderate the accounting information/decision-making relationship.

CONCLUSIONS AND IMPLICATIONS FOR FUTURE RESEARCH

From the above review of cognitive psychology and accounting literature, it may be clear that the role played by the contextual environment of decision-making is not minor. The possible effects of variation in contextual environment (information, salience, motivation, and memory-coding effects) have a significant potential that should be used, and controlled, in an accounting setting. Accounting is one of the fields where judgment serves an important function in decision-making and in shaping the final product, whether this is an audit opinion, financial statement, or a mere consultation. The consequences of an accounting mistake can be severe, and the impact of these effects on judgment and decision-making should be recognized by accountants and their clients alike.

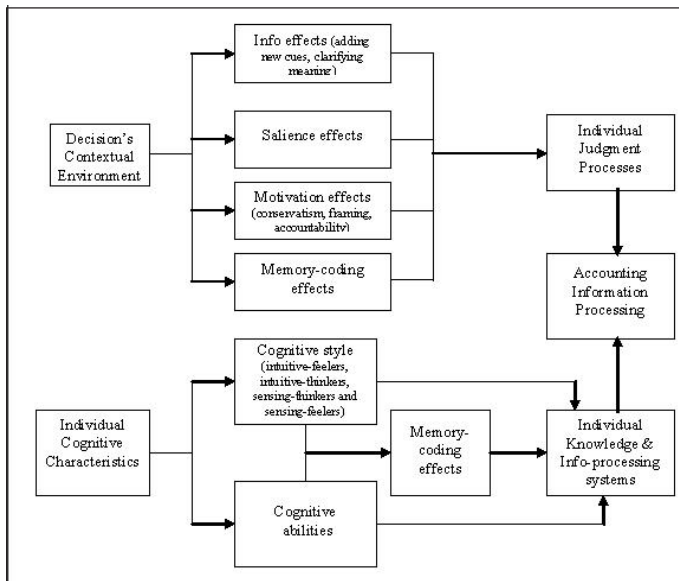
Furthermore, cognitive characteristics also play an important role in accounting decision-making. The cognitive style, abilities, and strategies of an individual decision maker reflect in the thinking, perceptual, and attitudinal style of decision-making. Interestingly, Ho and Rodgers (1993) believe that differences in the decision environment (context) may account for some of the mixed results of studies examining cognitive characteristics. Thus, the effects of context and cognitive characteristics have to be considered together in an integrated framework that explains behavioral issues in accounting decision-making. An integrated model that summarizes key contextual and cognitive factors affecting the decision-making process of accountants is illustrated in figure 1 below.

The preceding review highlights several areas for future research. To better understand the cognitive determinants of expertise, future research should incorporate cognitive abilities and cognitive styles in the research design. Also, future research should investigate how decision makers' cognitive strategies determine their selection of alternative decision rules (e.g. compensatory vs. noncompensatory).

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Figure 1. A model depicting the effect of context and cognitive characteristics on accounting decision making



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