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The effects of monetary incentives on effort and task performance: theories, evidence, and a framework for research

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Abstract

The purpose of this paper is to review theories and evidence regarding the effects of (performance-contingent) monetary incentives on individual effort and task performance. We provide a framework for understanding these effects in numerous contexts of interest to accounting researchers and focus particularly on how salient features of accounting settings may affect the incentives-effort and effort-performance relations. Our compilation and integration of theories and evidence across a wide variety of disciplines reveals significant implications for accounting research and practice. Based on the framework, theories, and prior evidence, we develop and discuss numerous directions for future research in accounting that could provide important insights into the efficacy of monetary reward systems.

1. Introduction

Monetary incentives frequently are suggested as a method for motivating and improving the performance of persons who use and are affected by accounting information (e.g. Atkinson, Banker, Kaplan, Young, 2001; Horngren, Foster, & Datar, 2000; Zimmerman, 2000), and their use in organizations is increasing (Wall Street Journal, 1999). Further, researchers have been encouraged to employ incentives in experimental studies so that subjects are sufficiently motivated and participate in a meaningful fashion (e.g. Davis & Holt, 1993; Friedman & Sunder, 1994; Roth, 1995; Smith, 1982, 1991). Anecdotal and empirical evidence, however, indicates that monetary incentives have widely varying effects on effort and, consequently, oftentimes do not improve performance (Bonner et al., 2000; Camerer & Hogarth, 1999; Gerhart & Milkovich, 1992; Jenkins, 1986; Jenkins, Mitra, Gupta, & Shaw, 1998; Kohn, 1993; Young & Lewis, 1995). Consistent with this, accounting studies examining the effects of incentives on individual performance find mixed results with regard to their effectiveness (e.g. Ashton, 1990; Awasthi & Pratt, 1990; Libby & Lipe, 1992; Tuttle & Burton, 1999; Sprinkle, 2000). If monetary incentives have disparate effects on effort and performance,

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then suggestions for their use in either the field or the laboratory should be informed by an understanding of the factors that moderate their effectiveness.

We have four objectives in this paper. Our first objective is to provide a conceptual framework for understanding the effects of (performance-contingent) monetary incentives on individual effort and performance and also to discuss theories that suggest mediators of the incentives-effort relation. Here, our focus is on explicating the motivational and cognitive mechanisms by which monetary incentives are presumed to increase performance; understanding these mechanisms is critical for determining how to maximize the effectiveness of monetary incentives. Theoretically, monetary incentives work by increasing effort which, in turn, leads to increases in performance. Given these relations, we first provide a detailed discussion of the various components of the effort construct: direction, duration, intensity, and strategy development. We then describe theories that detail the mechanisms through which monetary incentives are presumed to lead to increases in effort. These theories are expectancy theory, agency theory (via expected utility theory), goal-setting theory, and social-cognitive (self-efficacy) theory.

Our second objective is to enumerate and categorize important accounting-related variables that may combine with monetary incentives in affecting task performance. To do this, we express the monetary incentives-effort and effort-performance relations as a function of person variables, task variables, environmental variables, and incentive scheme variables. This conceptualization allows for a full, yet parsimonious, categorization of the numerous accounting-related variables that may affect these relations, thereby facilitating an understanding of the effects of monetary incentives in numerous contexts of interest to accounting researchers.

Our third objective is to review evidence regarding the effects of the combination of these important accounting-related variables and monetary incentives on individual effort and performance. Here, we choose one specific variable from each of the person, task, environmental, and incentive scheme categories within our framework

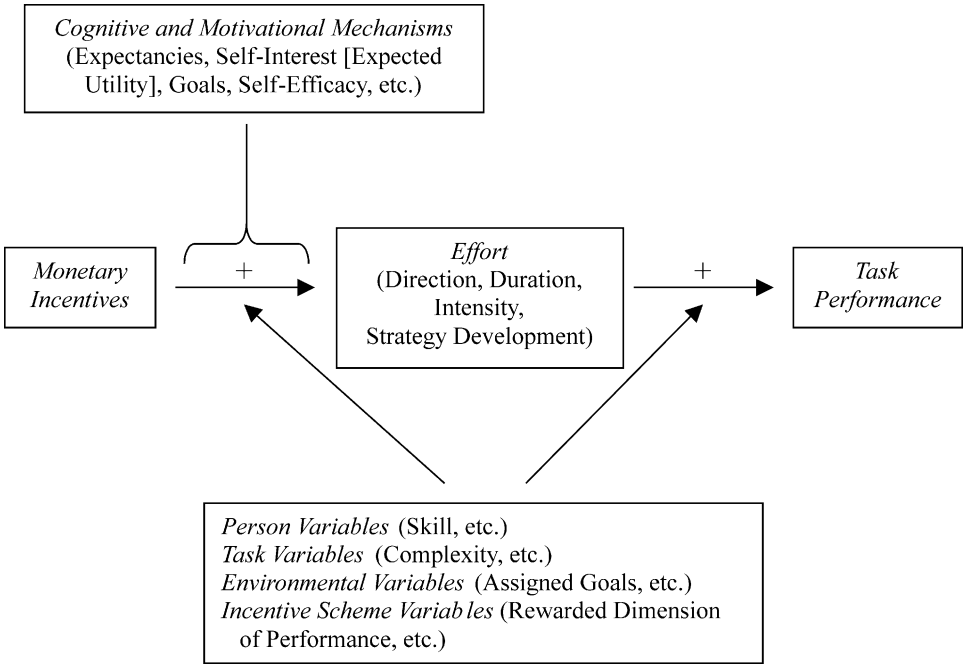

Fig. 1. Conceptual framework for the effects of performance-contingent monetary incentives on effort and task performance.

and discuss its effects on the incentives–effort and effort–performance relations. We also discuss the importance of each variable in accounting settings as well as the theoretical and practical importance of examining the variable in conjunction with monetary incentives. We then review studies from a wide variety of disciplines to discuss the empirical effects of these variables on the incentives–effort and effort–performance relations. Next, we provide insights regarding how the results from our compilation of studies may have significant implications for accounting research and practice. Finally, we briefly discuss the theoretical and empirical relations between monetary incentives and many other important accounting-related person, task, environmental, and incentive scheme variables.

Our final objective is to identify and discuss numerous directions for future research in accounting that would help fill gaps in our knowledge regarding the efficacy of monetary reward systems. Thus, for each of the person, task, environmental, and incentive scheme categories within our framework, we enumerate many important questions about the effects of monetary incentives on effort and task performance. We believe it is essential to address these questions given the important role that accountants and accounting information play in compensation practice and the design of performance-measurement and reward systems.

The remainder of this paper is organized as follows. In Section 2, we introduce our conceptual framework and discuss two important elements of the framework. First, we discuss the general effects of monetary incentives on effort and task performance and explicate the effort construct. Second, we discuss theories that suggest mediators of the incentives-effort relation. In Section 3, we complete our discussion of the conceptual framework; in particular, we discuss important accounting-related variables that may moderate the effects of monetary incentives on effort and the effects of effort on task performance. In discussing these moderators, Section 3 also provides detailed evidence regarding the effects of monetary incentives on effort and task performance under various situations, the implications of this evidence for accounting research and practice, and numerous directions for future accounting research. In Section 4, we summarize our main points and offer concluding comments.

2. Theories about the effects of monetary incentives on effort and task performance

The general hypothesis regarding the effects of monetary incentives on effort and performance is that incentives lead to greater effort than would have been the case in their absence.[1,2] This basic idea, however, does not explain *how* monetary incentives lead to increases in effort. Accordingly, theories about mediators of the incentives-effort relation deserve further attention, and we discuss these theories after explication of the effort construct.[3] In turn, increased effort is thought to lead

[1] A few theories predict that monetary incentives may lead to decreased effort and performance. For example, cognitive-evaluation theory (e.g. Deci et al., 1981; Deci & Ryan, 1985) suggests that monetary incentives, by focusing attention on the external reward related to a task, decrease intrinsic motivation and, thus, can decrease effort and task performance. Additionally, arousal theory (Broadbent, 1971; Easterbrook, 1959; Eysenck 1982, 1986; Humphreys & Revelle, 1984; Yerkes & Dodson, 1908) posits an inverted-U relationship between arousal and effort and, consequently, between effort and performance. That is, effort and performance initially increase as arousal increases, but then begins to decrease once arousal increases beyond a moderate level, thereby inducing anxiety. Since arousal and anxiety are posited to be created, in part, by motivational devices such as monetary incentives, arousal theory predicts that monetary incentives may either increase or decrease effort and task performance.

[2] While effort typically is discussed as the key intervening variable between monetary incentives and performance, some researchers have focused on other variables such as affect (Stone & Ziebart, 1995) and stress (Shields, Deng, & Kato, 2000). For example, Stone and Ziebart (1995) propose that monetary incentives increase negative affect and, in turn, increases in negative affect directly decrease performance. However, these researchers also note that variables such as affect and stress likely are important in explaining the relation between incentives and performance because they can mediate the incentives-effort relation rather than directly intervene between incentives and performance.

[3] The effort–performance relation is not connected to monetary incentives per se, so we do not discuss theories that explain this relation. For discussions of the effort-performance relation (Bandura, 1997; Kahneman, 1973; Kanfer, 1987; Locke and Latham, 1990; Navon and Gopher, 1979; Payne et al., 1990).

to an improvement in the rewarded dimension of task performance.[4] Fig. 1 presents a conceptual framework for the effects of monetary incentives on effort and task performance.[5] In the remainder of the paper, we discuss the various relations depicted by our framework.

First, we discuss the effort construct. *Greater effort* refers either to effort directed toward current performance of the task, which is thought to lead to immediate performance increases, or effort directed toward learning, which is thought to lead to delayed performance increases (improved performance on later trials). Increases in effort directed toward current performance are classified as changes in effort direction, effort duration, and effort intensity, whereas effort directed toward learning is characterized as strategy development (Bettman, Johnson, & Payne, 1990; Kahneman, 1973; Kanfer, 1990; Locke & Latham, 1990).

Effort *direction* refers to the task or activity in which the individual chooses to engage (i.e. what an individual does). As long as the expected benefits provided by monetary incentives outweigh the costs of doing a task or activity, incentives tied to performance theoretically should lead to effort being directed toward the rewarded task or activity. In the field, the effects of incentives on the direction of effort can be observed with such measures as absenteeism and task choice (Kanfer, 1990). Laboratory experiments usually constrain the direction of effort to a large degree in that they offer only one task to subjects and require subjects to remain present to receive incentive payments. However, if subjects focus on a particular dimension of a laboratory task as opposed to other dimensions, this is similar to making a choice among tasks. For example, subjects paid a piece rate for each completed toy assembly likely would focus on creating as many assemblies as possible rather than focusing on the quality of individual assemblies. Furthermore, subjects can choose to do the task or daydream. In these ways, monetary incentives may have effects on effort direction in the laboratory.

Effort *duration* refers to the length of time an individual devotes cognitive and physical resources to a particular task or activity (i.e. how long a person works). In the field, incentive contracts typically are based on relatively long periods of time, such as a year, and on performance measures that attempt (at least partially) to measure sustained effort over those periods. It seems fairly intuitive that monetary incentives can increase effort duration in these settings (e.g. employees may take fewer breaks or work overtime). The effects of monetary incentives on effort duration, however, also can occur in laboratory experiments. Specifically, these effects can appear in longer laboratory studies as well as studies in which subjects work at their own pace and control the time taken to complete the activity or task (i.e. subjects can leave the experiment at different times).

Finally, increases in effort directed toward current performance can come in the form of increases in effort *intensity*, which refers to the amount of attention an individual devotes to a task or activity during a fixed period of time (i.e. how hard a person works). As Kanfer (1990) notes, effort intensity essentially captures how much of one's total cognitive resources are directed toward a particular task or activity. In both the field and the laboratory, effort intensity may be measured by assessing performance on timed tasks or tasks involving explicit (fixed) time limits (assuming effort direction is constrained). Similar to the effects on effort direction and duration, monetary incentives theoretically have positive effects on effort intensity if people believe that short-term increases in cognitive resources deployed toward

[4] We discuss the effects of monetary incentives on non-rewarded dimensions of performance in Section 3.4.

[5] In our framework, we portray cognitive and motivational mechanisms as *mediating* the relation between monetary incentives and effort, and person variables, task variables, environmental variables, and incentive scheme variables as *moderating* the monetary incentives-effort relation and/or the effort-task performance relation. As discussed in Baron and Kenny (1986, p. 1174) a moderating variable "affects the direction and/or strength of the relation between the independent variable and a dependent variable". Baron and Kenny (1986, p. 1176) state that a mediating variable "explains how external physical events take on internal psychological processes. Whereas moderator variables specify when certain effects will hold, mediators speak to how or why such effects occur" (also see Reber, 1995).

the task will lead to increases in the performance measure for which they are being rewarded.[6]

Monetary incentives also may motivate people to invest effort to acquire the skills needed to perform a task so that future performance and rewards will be higher than they otherwise would be (i.e. learn). This notion of increased effort is referred to as *strategy development* and consists of conscious problem solving, planning, or innovation on the part of the person performing the task. Here, individuals may not be working on the task or activity per se. Compared to increases in effort direction, intensity, and duration, increases in effort directed toward strategy development are less automatic and also are likely to have a negative effect on performance in the short run, but a positive effect on performance in the long run. Given this, incentives are thought to promote effort directed toward strategy development when more automatic mechanisms are not sufficient to attain desired performance and reward levels (Locke & Latham, 1990).

Next, we discuss the proposed cognitive mechanisms by which monetary incentives influence the various dimensions of effort. Understanding these mechanisms is critical for determining how to maximize the effectiveness of monetary incentives (Bonner, 1999). For example, organizations may restructure incentive schemes in an attempt to enhance performance, but if the restructured elements of the incentives do not target the key cognitive processes that lead incentives to affect effort, then the restructuring will not be effective. Moreover, changes in incentive plans are costly (Gerhart & Milkovich, 1992), and understanding the cognitive processes affected by monetary incentives and setting up compensation plans that target these processes can reduce these costs. Such plans likely will have the most positive effects on effort and performance.

Although several theories explaining the effects of incentives on effort have been offered, we discuss only four. These four theories represent the predominant explanations offered for the effects of monetary incentives on effort direction, duration, and intensity; there is very little information about the mediators of the incentives-strategy development effort relation. The theories are expectancy theory, agency theory (via expected utility theory), goal-setting theory, and social-cognitive (self-efficacy) theory.[7] We first discuss the theories separately, and then present recent conceptualizations that combine elements of many of them.

Expectancy theory (e.g. Vroom, 1964) proposes that people act to maximize expected satisfaction with outcomes. Expectancy theory posits that an individual's motivation in a particular situation is a function of two factors: (1) the expectancy about the relationship between effort and a particular outcome (e.g. a certain level of pay for a certain level of performance), referred to as the "effort-outcome expectancy" and (2) the valence (attractiveness) of the outcome.[8] The motivation created by these two factors leads people to choose a level of effort that they believe will lead to the desired outcome.

[6] Some researchers consider "arousal" to be the same construct as effort intensity (e.g. Locke & Latham, 1990; also see Humphreys & Revelle, 1984). Other researchers and arousal theory, though, suggest that arousal (or stress) can affect the various dimensions of effort (e.g. Ashton, 1990; Eysenck 1982, 1986; Shields et al., 2000) and posit that arousal (or stress) is an important mediator in the monetary incentives–effort relation. This helps explain how monetary incentives may lead to increases, and particularly decreases, in effort. Because of this, we refer to arousal and stress directly in later sections of the paper when they might be viewed as constructs that are separate from effort intensity.

[7] Other theories of motivation discuss factors that, in addition to monetary incentives, can affect expectancies, utility, goals, and self-efficacy. In other words, these factors also affect the key processes through which monetary incentives are presumed to operate. These theories include Maslow's hierarchy of needs (1943), achievement theory (McClelland, Atkinson, Clark, & Lowell, 1953; Weiner, 1972), and reinforcement theory (Hamner, 1974; Skinner, 1953). For overviews of several motivation theories, see Kanfer (1990), Locke (1991), and Miner (1980).

[8] The effort–outcome expectancy can be broken down into an effort–performance expectancy, a performance–evaluation expectancy, and an evaluation–outcome expectancy to reflect factors that operate in the workplace such as imperfect evaluation processes and uncertainty about outcomes (Naylor, Pritchard, & Ilgen, 1980). These last two expectancies probably are minimized in laboratory studies of incentive effects because the performance criteria usually are clear and specified in advance, individuals are not being "evaluated" *per se*, and pay likely is the primary outcome of interest. Thus, the effort–outcome expectancy likely reduces to the effort–performance expectancy in the laboratory.

The effect of monetary incentives on effort in an expectancy-theory conceptualization is twofold. First, the outcome of interest is the financial reward. Money can have valence for a variety of reasons. Vroom's initial conception of the valence of money is that money is instrumental in obtaining things people desire such as material goods. In addition, money has symbolic value due to its perceived relationship to prestige, status, and other factors (Furnham & Argyle, 1998; Zelizer, 1994). Monetary incentives clearly have higher valence than no pay (if expected pay is greater than zero) and also may have higher valence than noncontingent incentives, depending on the relative payment schedules.

Second, expectancies also should be, and have been found to be, higher under monetary incentives than under no pay or noncontingent incentives due to the stronger links among effort, performance, and pay (e.g. Jorgenson, Dunnette, & Pritchard, 1973; Locke & Latham, 1990; Pritchard, Leonard, Von Bergen, & Kirk, 1976). Therefore, according to expectancy theory, an individual's motivation and subsequent effort likely are significantly higher when compensation is based on performance, due to both an increased expectancy about the effort–outcome relationship and an increased (or at least no change in the) valence of the outcome.

Agency theory (e.g. Baiman, 1982, 1990; Eisenhardt, 1989), via its assumption that individuals are expected utility maximizers, adds further structure in explaining the effects of monetary incentives on effort. Specifically, a fundamental assumption of agency theory is that individuals are fully rational and have well-defined preferences that conform to the axioms of expected utility theory. Further, individuals are presumed to be motivated solely by self-interest, where self-interest is described by a utility function that contains two arguments: wealth and leisure. Individuals are presumed to have preferences for increases in wealth and increases in leisure (reductions in effort).

Agency theory (and most models of economic behavior) therefore posits that individuals will shirk (i.e. exert no effort) on a task unless it somehow contributes to their own economic well-being. Incentives that are not contingent on performance generally do not satisfy this criterion.[9] Thus, similar to expectancy theory, agency theory suggests that incentives play a fundamental role in motivation and the control of performance because individuals have utility for increases in wealth. Additionally, agency models typically assume that individuals (employees) are strictly risk-averse and, therefore, also must be paid a risk-premium when monetary incentives are based on imperfect surrogates of behavior (e.g. output that is a function of both effort and some random state of nature). Thus, monetary incentives can lead to inefficient risk-sharing, although the motivational (effort) benefits associated with linking pay to performance are presumed to exceed this loss in efficiency. Monetary incentives must therefore appropriately balance the need for providing motivation (to increase effort) against the need for risk-sharing (Holmstrom, 1989).

In essence, both expectancy theory and agency theory suggest that monetary incentives affect the attractiveness/utility of various outcomes, and that effort affects the probability of achieving these outcomes. Thus, monetary incentives increase an individual's desire to increase performance and concomitant pay. In turn, this desire motivates individuals to exert costly effort because increases in effort are presumed to directly lead to increases in expected performance. However, neither expectancy theory nor agency theory provides much information about the cognitive mechanisms whereby the motivation created by monetary incentives leads to changes in effort. Goal-setting theory and social-cognitive theory add further richness to these fundamental ideas.

Goal-setting theory (Locke & Latham, 1990) proposes that personal goals are the primary determinant of, and immediate precursor to, effort. In other words, personal goals are the stimulant of the incentive-induced effort increases described above.[10] In particular, research indicates

[9] With a sufficiently high level of monitoring and penalties, noncontingent pay could be optimal. Additionally, Fama (1980) has argued that the effects of reputation on one's market wage may reduce (or even eliminate) the need for *explicit* performance-based incentives.

[10] Personal goals are those chosen by individuals and, as such, may or may not be the same as the goals assigned by an organization or experimenter.

that specific and challenging personal goals lead to greater effort than goals that are vague or easy, or no goals at all. Challenging goals lead to greater effort than easy goals simply because people must exert more effort to attain the goal. While goal-setting theory allows for expectancies to affect personal goals, evidence shows that assigned goals have a much larger effect on personal goals than do expectancies. Further, expectancies and personal goals have separate effects on effort and performance, indicating they capture different cognitive processes (Locke & Latham, 1990, p. 72).

The manner in which monetary incentives affect effort in a goal-setting conceptualization is not completely clear, but several processes have been proposed. In particular, Locke, Shaw, Saari, and Latham (1981) proposed three possible ways in which incentives can affect effort via goal setting. First, monetary incentives may cause people to set goals when they otherwise would not. Such an effect of monetary incentives is not captured by expectancy theory or most economic models of behavior since individuals' "goals" are presumed to be well-specified in advance. Second, monetary incentives might cause people to set more challenging goals than they otherwise would; these goals in turn lead to higher effort. One can view this as being captured by expectancy theory and expected utility (agency) theory in the sense that people are simply choosing outcomes that require higher levels of effort because the attractiveness associated with their performance outcomes is increased by incentives. Finally, monetary incentives may result in higher goal commitment (and thus greater effort) than noncontingent incentives or no incentives. This proposed effect of incentives on effort typically would not appear in expectancy theory or expected utility theory conceptualizations because commitment is presumed to be invariant. Consequently, goal-setting theory provides a description of the effect of incentives on effort that goes beyond their effects on expectancies and outcomes (probabilities and values).

Social-cognitive (or self-efficacy) theory (Bandura, 1986, 1991, 1997) proposes self-regulatory cognitive mechanisms that relate to effort. Self-efficacy theory effectively expands upon both expectancy theory and goal-setting theory by further explicating the cognitive factors that affect effort and, consequently, the possible cognitive mechanisms by which monetary incentives can affect effort. Specifically, self-efficacy, or an individual's belief about whether he or she can execute the actions needed to attain a specific level of performance in a given task, is posited to be an important determinant of effort.[11] Self-efficacy is thought to help people regulate their effort and, consequently, it can affect effort direction, effort duration, effort intensity, and strategy development. In other words, self-efficacy is thought to be another variable (in addition to goals) that affects the key dimensions of effort. Self-efficacy also is posited to affect effort indirectly through its impact on goal levels and goal commitment. For example, people with high self-efficacy like to take on challenges by setting high personal goals and being strongly committed to achieving those goals.

However, while self-efficacy focuses on goal setting as a principal means of regulating one's behavior, it allows for other factors to come into play. In particular, self-efficacy is thought to affect effort through several cognitive, motivational, affective, and task mechanisms.[12] Cognitive and motivational mechanisms include goal setting, expectancies, and the increased use of high-quality problem-solving strategies. Self-efficacy also can have positive effects on initial emotional states (those prior to task performance) and can alleviate aversive emotional states that arise during task performance. Finally, self-efficacy affects the initial selection of tasks in that higher self-efficacy leads to the choice of more challenging tasks to perform.

[11] Bandura (1997) notes that self-efficacy is not to be confused with self-esteem. Self-efficacy is a belief about one's ability to perform a specific task, whereas self-esteem is a global evaluation of self-worth.

[12] Additionally, Bandura (1997) claims that the self-efficacy construct goes beyond the effort–performance expectancy idea, thus expanding on expectancy theory in that it reflects all factors (not just effort) that a person believes can affect his or her performance on a particular task or activity. Others (e.g. Locke & Latham, 1990) question this idea from an operational standpoint. They note that, while in theory, self-efficacy is a broader construct than the effort–performance expectancy, measurements of the two likely produce similar results because people typically are not asked to limit themselves to considering the effects of effort on performance when their expectancies are measured.

Because self-efficacy affects many factors, the roles of incentives in affecting effort in self-efficacy theory likely are more numerous than those specified by expectancy, agency, and goal-setting theories. The general relation between monetary incentives and self-efficacy is as follows (Bandura, 1997). Incentives lead to increased task interest and, consequently, to increased effort. In turn, increased effort generally leads to improved performance, greater skill on the task (if the person has the ability to increase skill), and increased self-efficacy. The increase in self-efficacy due to incentives can then flow through to effort through the various goal mechanisms or through other cognitive, motivational, affective, or selective mechanisms described above.[13]

Recent discussions of factors that mediate the incentives-current effort relation appear to incorporate elements of many of these theories (e.g. Klein & Wright, 1994; Lee, Locke, & Phan, 1997; Locke & Latham, 1990; Riedel, Nebeker, & Cooper, 1988; Wright, 1989, 1990, 1992; Wright & Kacmar, 1995). For example, Wright and Kacmar (1995) propose that performance-contingent incentives affect self-efficacy (a broadened expectancy) and attractiveness (valence) of goal attainment, which affects personal goal level and goal commitment. Similarly, Riedel et al. (1988) suggest that incentives affect valence and expectancies, which can lead to spontaneous goal setting and higher levels of goals and goal commitment. And, as noted above, self-efficacy theory specifically includes personal goals as one of the more important choices caused by self-regulatory behavior.

In summary, the fundamental hypothesis that predicts a positive overall relation between the presence of monetary incentives and task performance is that incentives increase effort and increased effort leads to improvements in performance (either in the short run or the long run). Furthermore, a number of mechanisms have been proposed for explicating the incentives-effort link, including expectancies, self-interest, goal setting, and self-efficacy.

In contrast to this fundamental hypothesis, empirical evidence indicates that monetary incentives frequently are not associated with increased effort and improved performance. For example, in reviewing laboratory studies of incentives, Bonner et al. (2000) found that incentives lead to significant performance improvements in no more than half the studies (also see Camerer & Hogarth, 1999; Jenkins et al., 1998). In addition, Guzzo, Jette, and Katzell's (1985) meta-analysis of field studies of various motivating techniques, including financial incentives, indicated that financial incentives had widely varying effects and a mean effect that was not significantly different from zero (also see Prendergast, 1999). Empirical studies that examine the effect of incentives on mediating factors also find mixed results. For example, incentives sometimes lead to higher goals, greater commitment, and/or enhanced self-efficacy, and sometimes do not (Lee et al., 1997; Wright, 1989, 1990, 1992; Wright & Kacmar, 1995).

Studies examining the effects of incentives on performance, as well as studies examining mediators of the incentives–effort relation note that there must be factors that moderate these relations, thereby causing incentive effects to not always be positive (and to not always be consistent with proposed mediating forces). To date, however, reviews have discussed relatively few such factors and, as such, little is known about variables that interact with incentives in affecting task performance. Again, it is important to identify factors that moderate the effectiveness of incentives so that researchers and organizations can have better information about the use of monetary incentives in either the field or the laboratory.

[13] Note that this explanation can pertain only to multiple-trial situations in which subjects perform the task and receive feedback. In single-trial situations (as is the case in many experiments) a positive incentives–self-efficacy relation is less likely because, as Bandura (1991) notes, the motivation that comes from self-efficacy is not likely to be activated unless people know how well they are performing. Thus, any relation between incentives and self-efficacy in these settings would have to be predicated on an expectancy-theory conceptualization or a reframing of self-efficacy as a goal. For example, an expectancy-theory view might be that people believe incentives will propel them toward greater effort in order to attain the reward; this belief then leads to increased self-efficacy. Alternatively, as Baker and Kirsch (1991) discuss, if self-efficacy represents one's beliefs about his or her skills, incentives are unlikely to affect self-efficacy in the short run because people know they cannot improve their skills in a short time. Rather, for incentives to have an effect on self-efficacy, beliefs must represent one's intentions (goals).

The remainder of this paper discusses salient accounting-related variables that may moderate the positive effects of monetary incentives on task performance. For each variable presented, we discuss its importance in accounting settings as well as the theoretical and practical importance of examining the variable in conjunction with monetary incentives. We then summarize the prior research examining the joint effects of monetary incentives and the particular variable. In these summaries, we discuss the general findings, attempt to tie these findings back to the theories and underlying cognitive mechanisms previously discussed, and then discuss the potential implications for accounting research and practice. Following this, we highlight numerous open issues regarding the efficacy of monetary incentives in improving task performance and provide suggestions for how future accounting research could help fill these gaps in our knowledge. We attempt to accomplish these objectives within a framework (Fig. 1) that we feel is helpful for understanding the effects of monetary incentives on performance. In the next section, we further elaborate on our framework and present the empirical evidence.

3. Evidence regarding the effects of monetary incentives on effort and performance and a framework for research

In discussing accounting-related variables that may combine with monetary incentives to affect effort and task performance, we employ and add to Bonner's (1999) three broad categories of variables that determine performance (also see Payne, Bettman, & Johnson, 1990). Specifically, Bonner (1999) sets performance = f (person variables, task variables, environmental variables). Such a model allows for full, yet parsimonious, consideration of the factors that may affect performance.[14] We modify Bonner's (1999) model for use in our framework since we focus specifically on the monetary incentives-effort and effort-performance relations (Fig. 1). Specifically, we suggest that these relations = f (person variables, task variables, environmental variables, *incentive scheme* variables). Person variables are those that relate to the individual performing the task; they are characteristics the person brings to the task such as motivation, personality, and abilities.[15] Task variables are those that relate to the task itself; a "task" can be defined as a piece of work assigned to or demanded of a person. Task characteristics can vary within tasks. For example, a bankruptcy prediction task can be framed as predicting the probability the company will fail or it can be framed as predicting the probability the company will survive. Some task characteristics, like complexity, also vary across tasks. For example, problem-solving tasks generally are more complex than other tasks.

Environmental variables include all the conditions, circumstances, and influences surrounding a person who is doing a specific task. In other words, these variables do not relate to a particular task or person but can surround all tasks and persons in a given setting. Monetary incentives typically are considered an environmental variable, along with factors like time pressure, accountability requirements, and assigned goals (and Libby and Luft (1993) and Bonner (1999) discuss them in this way). Because our paper focuses on the effects of performance-contingent incentives (vis-à-vis no incentives or non-contingent incentives), we examine environmental variables that interact with incentives. Finally, we consider elements of incentive schemes per se that could alter the relations between (the presence of) monetary incentives and effort, as well as between effort and performance, such as what dimension(s) of performance the incentive scheme rewards.

[14] This model is similar in spirit to the one employed by Libby and Luft (1993) in that it serves to enumerate and categorize variables that may influence performance. These categories differ from Libby and Luft's (1993), though, in two ways. First, Libby and Luft (1993) discuss three specific person variables—ability, knowledge, and motivation—rather than discussing the more general category that includes other important characteristics of people. Second, Libby and Luft (1993) do not include task variables in their formulation other than noting that the relative effects of the other variables may differ across types of tasks (i.e. they do not specifically include the main effects of various task factors).

[15] The term "ability" refers to traits that are formed by the time one is an adult, i.e. traits that are influenced mostly by genetic factors and early childhood experiences (Carroll, 1993).

Evidence regarding the effects of monetary incentives on effort and performance comes from a large body of literature in accounting, economics, finance, management, and psychology. Given the enormity of these literatures, we restrict our attention to studies that employ laboratory experiments or highly controlled field experiments. Additionally, we only consider studies that report the effects of *monetary* incentives on *individual* effort and performance and for which there is some normative performance standard (i.e. the criterion for high performance is clear). This means that we do not consider the literature on incentive effects in games or markets (multi-person settings). While these clearly are of interest in accounting, we chose to restrict our attention to the individual. We also do not examine tasks involving the choice between a certainty equivalent and a gamble, for example, as there is no normative performance criterion for such tasks.

We first reviewed the 85 experimental studies covered by the Bonner et al. (2000) review. Second, we read a large number of additional studies related to the efficacy of incentives that did not meet the Bonner et al. (2000) criteria but were of relevance in developing our theoretical arguments. Third, we read summaries of the literature on the theoretical mediators of incentive effects, including articles related to expectancies, self-interest (agency relationships), arousal (stress), self-efficacy, and goal-setting, as well as numerous other individual empirical and theoretical articles. Fourth, we read several review papers from accounting, economics, management, and psychology regarding the effects of incentives.[16] Finally, we read numerous papers related to the person, task, environmental, and incentive scheme variables we examine and their independent effects on effort and performance.

[16] We also considered the executive compensation literature (see Pavlik, Scott, & Tiessen, 1993 for a review). Because this literature examines the relation between compensation (incentives) and firm performance, however, it is difficult to compare it to the literature we review (that examining individual performance). For example, as Pavlik et al. note, the direction of the relation between executives' *individual* performance and compensation is unclear (i.e. it is not clear that the incentives lead to the performance). As a result, we do not discuss the findings from the executive compensation literature.

In developing our arguments about the effects of various factors on the incentives–effort and effort–performance relations, we discuss papers and theories as necessary. In other words, our paper is not meant to provide an exhaustive, detailed review of studies of incentive effects. Rather, our goal is to integrate diverse findings and theories regarding the mechanisms by which incentive effects occur and/or can be altered. To the extent previous reviews have investigated the variables we discuss here, we cite their findings. Finally, to the extent possible, we discuss whether the variables we consider moderate the incentives–effort relation or the effort–performance relation (or both).

3.1. Person variables

In this section, we discuss how person variables may affect the relation between monetary incentives and effort and effort and task performance. Person variables include attributes that a person possesses prior to performing a task, such as knowledge content, knowledge organization, abilities, confidence, cognitive style, intrinsic motivation, cultural values, and risk preferences. These person variables (like other variables) can affect performance through various cognitive processes that the person brings to bear while performing a task, such as memory retrieval, information search, problem representation, hypothesis generation, and hypothesis evaluation.

Person variables play an important role in the performance of many accounting-related tasks. For example, prior research documents that individual factors such as knowledge content (e.g. Bonner & Lewis, 1990; Bonner & Walker, 1994; Bonner, Davis, & Jackson, 1992; Cloyd, 1997; Dearman & Shields, 2001; Hunton, Wier, & Stone, 2000; Vera-Muñoz, 1998) and knowledge organization (e.g. Dearman & Shields, 2001; Frederick, 1991; Nelson, Libby, & Bonner, 1995) can significantly affect performance in a wide variety of accounting tasks. Prior accounting research also informs us that various abilities, such as analytical reasoning ability, can affect the task performance of accountants as well as those who use and are affected by accounting information (Awasthi & Pratt, 1990; Bonner et al., 1992; Bon-

ner & Lewis, 1990; Hunton et al., 2000; Tan & Libby, 1997). Furthermore, accounting research has shown that numerous other person variables, including confidence (Bloomfield et al., 1999; Cote & Sanders, 1997), cognitive style (Bernardi, 1994; Johnson, Kaplan, & Reckers, 1998; Mills, 1996; Pincus, 1990), intrinsic motivation (Becker, 1997), cultural values (Harrison, Chow, Wu, & Harrell, 1999), and risk preferences (Shields, Chow, & Whittington, 1989; Young, 1985) also can affect performance in accounting settings.

While there are numerous person variables that could be studied in conjunction with monetary incentives, we devote our primary attention to the role of variables that are included under the rubric "*skill*". We do so for three reasons. First, skill, broadly defined, subsumes many of the person variables previously discussed, including knowledge content, knowledge organization, and the various abilities that are relevant to performance in a task. Second, skill plays a crucial role in the performance of numerous accounting-related tasks (Bonner & Lewis, 1990; Libby & Luft, 1993). Third, in suggesting solutions for improving task performance, it often is important to understand exactly what skills the person brings (or does not bring) to the task (Bonner, 1999). Since monetary incentives frequently are suggested as a mechanism for improving performance, it is important to understand how a person's skill affects the relation between monetary incentives and performance.

3.1.1. Effects of skill on the incentives–effort–performance relation: direct role of skill

Skill can alter the effects of monetary incentives on performance because of its important effects on performance via several cognitive processes. For example, skill includes knowledge (content) of factual information that, when retrieved from memory, can enhance task performance. Skill also includes the organization of knowledge around meaningful concepts, and appropriate knowledge organization can facilitate the search for pertinent information, the initial setup of problems (problem representation) and the generation of initial hypotheses. All of these cognitive processes have substantial effects on performance. In a similar vein, mental and physical abilities of various sorts aid in various cognitive and physical processes that influence performance on many tasks, so that the lack of requisite ability can severely constrain performance. For example, problem-solving ability can help auditors diagnose errors when using analytical procedures (Bonner & Lewis, 1990).

The direct effects of skill on performance suggest that, despite the perfect rationality assumption governing most economic models (Conlisk, 1996; Simon, 1986), skill may affect the incentives-performance relation by attenuating the positive effects of incentive-induced effort on performance. Specifically, individuals may try harder in the presence of incentives (e.g. exhibit higher effort intensity or higher effort duration) but, if they lack the skill needed for a given task, their performance will be invariant to increases in effort (e.g. Arkes, 1991; Bonner et al., 2000; Camerer, 1995; Kanfer, 1987; Smith & Walker, 1993). Although skill has been discussed extensively as having an attenuating effect on the effort-performance relation, there are few empirical studies that present direct evidence regarding this issue.[17]

Awasthi and Pratt (1990) found that subjects working under performance-contingent incentives exhibited higher effort duration than subjects working under fixed pay, irrespective of skill.[18] However, subjects with incentives did not perform better than those working under fixed pay unless they possessed a high degree of skill. These findings are consistent with the proposed role of skill in attenuating the effort–performance relation. That is, while monetary incentives motivated subjects to increase effort duration, they only increased performance for those subjects with high task-relevant skill.

Qualitatively similar findings are reported in Bonner, Hastie, Young, Hesford, and Gigone (2001), who examined the effects of several incen-

[17] There are a number of incentives studies that measure skill but do not examine whether it moderates the incentives-effort or effort-performance relations. Instead, they either adjust performance measures for initial skill or ensure that mean skill does not differ across incentive treatments (e.g. Hogarth et al., 1991; McGraw & McCullers, 1979; Toppen, 1965a, 1965b, 1966).

[18] Awasthi and Pratt (1990) did not measure other dimensions of effort, such as effort intensity or strategy development.

tive schemes on subjects' performance in a mental multiplication task. Although mental multiplication is a task that the subjects understood how to perform, they varied dramatically in their skill at the task. The authors also allowed time for further learning by examining subjects' performance in very lengthy experiments. Specifically, in their second experiment, which lasted 90 h over 12 weeks, monetary incentives increased effort duration for all subjects but only increased effort intensity for high-skill subjects. Further, monetary incentives increased two measures of performance for high-skill subjects, but only one measure of performance for low-skill subjects. Collectively, these findings are somewhat consistent with a lack of skill attenuating the effort–performance relation, although low-skill subjects' effort only increased as to duration under monetary incentives. That is, skill affected both the incentives–effort and effort–performance relations in this study.

Other studies present findings that are suggestive of the role of skill in attenuating the incentive-induced effort–performance relation. These studies employ a multi-period approach and find that: (1) incentive-related differences in performance in skill-sensitive tasks increase over time (e.g. Huber, 1985; London & Oldham, 1977; Sprinkle, 2000), or (2) incentive-related differences in performance of simple tasks for which subjects possess skill do not change over time (e.g. Bailey, Brown, & Cocco, 1998; Harley, 1965a, 1965b; Pollack & Knaff, 1958). The first type of finding suggests that the increased effort induced by incentives has a greater effect when subjects' skill on the task increases. The second type of finding suggests that, when subjects possess skill, incentive-induced effort increases can flow through to performance, i.e. a positive effort–performance relation remains intact.

Given the small amount of evidence that directly addresses the role skill plays in attenuating the effort–performance relation, the appropriate implications for accounting research and practice are unclear. Under what conditions a lack of skill means that incentive-induced effort will not improve performance remains a rather complex open issue. First, in order for skill to attenuate the incentives-induced effort–performance relation, incentives must lead to increases in effort. Thus, incentives must meet subjects' reservation wages or some minimum level of symbolic value. In other words, the expected utility from the incentives must exceed the disutility from working on the task.[19] Additionally, there must not be other person, task, environmental, or incentive scheme variables that substantially reduce the effect of incentives on effort.

Second, in order for a lack of skill to attenuate the incentives-induced effort–performance relation, skill and effort, like numerous other factors of production, must be complements to some extent (i.e. the marginal rate of technical substitution between skill and effort must not be constant; see, e.g. Jehle & Reny, 2001). Thus, increases in effort cannot completely substitute for a lack of skill. Assuming that there is a continuum describing the relation between skill and effort in their effects on performance (with the endpoints being skill and effort as complete complements versus skill and effort as complete substitutes), the question arises as to whether skill and effort act more like complements or more like substitutes. Our belief is that most accounting-related tasks require some skill (knowledge and/or ability), but that possessing skill is not sufficient to guarantee high levels of task performance. That is, individuals must exert some effort to bring their skill to bear in most tasks. The tasks that may be exceptions are tasks that involve relatively automatic cognitive processes such as frequency learning and estimation (Libby & Lipe, 1992). For such tasks, lack of skill is less likely to attenuate the positive effort–performance relation because this relation is of much smaller magnitude when tasks require very little effort.[20]

Given the small number of tasks examined by prior research, but the wide variety of accounting-related tasks, future research directed toward

[19] In situations where incentives do not meet reservation wages or a minimum level of symbolic value, as may occur in some experiments, there may be no effect of incentives on effort, in which case the role of skill in the effort-performance relation becomes moot.

[20] The reverse phenomenon would occur when tasks require virtually no skill, although it is unclear that there are many accounting-related tasks that require little or no skill.

understanding the relations among skill, effort, and performance in a broader range of tasks seems warranted. Such research could provide useful insights regarding whether and when skill and effort act more like complements or substitutes and, thus, the relative importance of skill and effort in affecting performance in accounting settings. This research also could examine whether the relative importance of skill and effort depend on inherent characteristics of the task or, instead, whether this relationship can be altered by other factors.

For example, all auditing firms are bound by professional standards to conduct an audit in accordance with Generally Accepted Auditing Standards (GAAS). However, firms choose to meet the requirements for a GAAS audit in substantially different ways. Some firms employ structured audit approaches for gathering evidence; these structured approaches make use of a number of decision aids and templates. Other firms employ very unstructured approaches that allow auditors to determine the types of evidence to gather for a particular audit. These differences in structure affect the experience level of auditors assigned to a given task—firms with structured approaches assign relatively less experienced auditors than do firms with unstructured approaches (Prawitt, 1995). This might suggest that firms employing structured approaches believe effort is relatively more important (vis-à-vis skill) in auditing tasks than do firms employing unstructured approaches. Consequently, research that informs us about the relative importance of skill and effort in key accounting tasks and whether this relative importance is embedded within the task (versus created by audit technology) could inform audit firms about the potential effectiveness of incentives and the circumstances under which they will be most effective.

We also know very little about whether a lack of skill attenuates the relation between all dimensions of effort and performance or just that between some dimensions of effort and performance. For example, while a lack of skill in the *short run* can attenuate the positive relation between effort and performance, monetary incentives may lead to strategy development, which over the *long run* can allow individuals to acquire the necessary skill they need, thereby ultimately restoring a positive relation between incentives and performance (e.g. Sprinkle, 2000). This raises questions regarding the types of skills that can be acquired by exerting effort under incentives, and how long it takes for effort directed toward skill acquisition to "pay off". Since many of the skills that have been examined in accounting research are "innate" abilities and, thus, relatively fixed by the time people are adults (Carroll, 1993), it is possible that for many accounting-related tasks, skill deficiencies created by a lack of ability will attenuate the effort–performance relation over the long run as well as the short run. Additional research is needed to address this question.

3.1.2. Effects of skill on the incentives–effort–performance relation: indirect (self-selection) role of skill

The second role of skill as it relates to performance and, more specifically, the effect of incentives on performance is the indirect screening or self-selection role. Skill is a factor that people consider when assessing their self-efficacy (Bandura, 1997). Again, self-efficacy is a person's judgment of his or her capability for performing a specific task (Stajkovic & Luthans, 1998). Self-efficacy plays an important role in a person's choice to perform a task or job, or even work for a particular firm. In other words, self-efficacy affects initial effort direction. In addition, because self-efficacy positively affects the goals people set, self-efficacy also can affect effort duration and intensity, as well as strategy development. Overall, then, skill has an indirect effect on performance because skill is positively related to self-efficacy and self-efficacy affects the selection of tasks, as well as consequent effort and performance in those tasks. Consequently, on average, we would expect that individuals with appropriate levels of skill would select tasks requiring those skills and choose to exert high levels of effort.

By the same token, firms use hiring and promotion processes to assign employees to tasks and jobs, and such task assignments naturally reflect a consideration of individuals' skill, among other factors. Thus, firms' perceptions of skill indirectly

affect task performance to the extent these perceptions result in a sample of individuals with higher actual skill.[21] In contrast, when people are assigned to tasks in experimental settings, the experimenter typically does not consider subjects' skill. Thus, he or she may be asking subjects to perform tasks for which they lack skill and, consequently, for which they have low self-efficacy, low goals, and thus, low effort (i.e. subjects "give up").

The self-selection role of skill in improving performance suggests another role for skill in affecting the effects of incentives on performance. Specifically, if an experimenter or an employer *assigns* people to tasks for which they do not have the necessary skill, people may know that they lack the requisite skill and, as a result, the lack of skill may attenuate a positive incentives–effort relation. In other words, people who lack skill may "give up" (not increase their effort due to lowered self-efficacy and lowered goals) under incentives if they believe that effort increases will not lead to performance increases and consequent rewards. This giving-up phenomenon could be particularly prevalent under incentive schemes like tournaments where individuals may believe there is a low probability of receiving compensation (Bull, Schotter, & Weigelt, 1987; Dye, 1984).

By contrast, when individuals are allowed to *select* their own incentive contracts for a particular task, we would expect that persons lacking skill, on average, would choose contracts that do not include performance-based incentives (i.e. they would choose fixed pay contracts), whereas persons who perceive that they have adequate skill would choose performance-based contracts. That is, economic theory suggests that monetary incentives may serve as an important mechanism for sorting individuals based on skill (e.g. Demski & Feltham, 1978; Riley, 1979; Spence, 1973). Because individuals with lower skill choose non-contingent pay, skill likely does not decrease the effect of incentives on effort for those choosing performance-based incentives contracts. In other words, incentives can "work" because individuals choosing performance-contingent rewards have appropriate skill. Further, it also is possible that having the opportunity to choose one's contract can actually increase the positive effect of incentives on effort because choosing a performance-contingent contract also commits one to exerting high levels of effort and, thus, may lead to higher goals as well as greater commitment to achieving high performance.

A few empirical studies have examined whether having the opportunity to choose an incentive contract affects performance. For example, Chow (1983) found that subjects who selected a budget-based compensation scheme had higher skill (and performance) than subjects who selected a flat rate scheme. Further, subjects who selected the budget-based contract outperformed those who were assigned the same budget-based contract, and there were no differences between subjects who selected flat rate schemes and those assigned to these schemes. The effects of selecting the budget-based contract on performance were due to initial skill for a group of subjects who had a difficult goal, but were due to the combination of initial skill and the opportunity to choose in a group of subjects who had a moderate goal. In a follow-up study, Waller and Chow (1985) also found that subjects selecting a pure fixed pay contract had lower skill and performance than subjects selecting a pure quota contract (also see Shields & Waller, 1988). Additionally, Waller and Chow (1985) found that, after controlling for skill, the type of incentive contract chosen had no effect on performance.

Similar findings regarding the relation between skill and choice of incentive contracts were reported by Dillard and Fisher (1990); however, they found no differences in performance between subjects who self-selected or were assigned incentives. Farh, Griffith, and Balkin (1991) found the self-selection effect both with regard to initial skill and task performance. Additionally, Farh et al. (1991) found the same pattern of differences between

[21] Such perceptions are not always accurate. Prior research shows that individuals within firms who make job assignments may make errors in their assessments of others' skill. For example, superiors judge subordinates' skill based on a consideration of their own skill (e.g. Kennedy & Peecher, 1997). Other factors also may contribute to errors in superiors' judgments of subordinates' skill such as prior experience with a particular performance evaluation scheme (Frederickson et al., 1999). See Hunt (1995) for a review of this literature.

assigned and self-selecting groups with regard to goal levels, i.e. self-selecting groups had higher goals. Here, the authors posited that the opportunity to choose an incentive contract positively affects commitment to that contract which, in turn, positively affects goal levels and task performance, although they did not measure the commitment to the contract or directly examine whether goal levels were a mediator of the choice-versus-assignment effect on performance. An alternative explanation is that higher levels of self-efficacy (due to higher levels of initial skill) led to the higher levels of goals.

Collectively, the findings from studies that have examined the interaction of the self-selection of incentive contracts and skill are consistent with the notion that high-skill individuals tend to choose performance-based incentive contracts while low-skill individuals tend to choose flat-rate contracts. Further, subjects who choose performance-based contracts often outperform those who choose flat-rate contracts, although not always. In one instance, there is an effect for choice of contracts that is not attributable to initial skill differences; however, most studies find that task performance differences relate to differences in initial skill. Finally, subjects who choose performance-based contracts often outperform those who are assigned the same contracts, but subjects who choose flat-rate contracts only sometimes underperform those who are assigned to such contracts. In short, these findings are mostly consistent with the posited interaction between incentives and skill in skill's self-selection role.

One implication of this research for accounting is that incentive contracts tied to standards can facilitate the attraction of individuals with higher skill. This can help firms reduce adverse selection problems which, in turn, can improve task assignment and overall firm performance. For example, job ladders within firms, whereby incentives (promotion, etc.) are tied to fulfilling certain job standards, are believed to greatly facilitate the sorting of employees based on their skills (Milgrom & Roberts, 1992). In this way, monetary incentives linked to standard attainment help cull managers and executives with the greatest potential to increase firm value. That said, the evidence to date also raises a number of questions. First, while prior research reports fairly consistent findings that performance-based incentives attract high-skill individuals, the types of contracts examined have been fairly limited. Most studies have used budget-based schemes with moderate goals (where the goal is to exceed average pretest performance). Thus, it is not clear whether budget-based schemes with very easy goals or very difficult goals will yield the same benefits. Further, it is unclear whether other forms of incentives, such as tournament contracts, will perform better or worse than budget-based contracts at attracting skilled individuals. For example, while tournaments may demotivate the average person to whom they are assigned (because they believe the probability of winning is low), if self-selection is allowed, they may attract very skilled individuals who believe they have an excellent chance of winning (e.g. Prendergast, 1999). Thus, when both the effort and selection effects are considered, it is unclear whether budget-based contracts will perform better than tournament contracts.

Second, other person factors such as risk preferences have been proposed to moderate the relation between skill and the selection of performance-based incentive contracts (Chow, 1983). Further, because people use their *perceptions* of skill in making this choice, it is important to examine factors besides actual skill that affect perceptions of skill. For example, research indicates that men tend to be overconfident about their skill while women tend to be underconfident (Estes & Hosseini, 1988; Lundeberg et al., 1994); this might suggest that more men than is "warranted" based on actual skill would select performance-based pay, while fewer women than is "warranted" would select performance-based pay. Finally, people may be less able to determine whether they have appropriate skill for complex tasks than for simple tasks (Gist & Mitchell, 1992). Being aware of factors that affect perceptions of skill and moderate the relation between skill and selection of performance-based incentives is important not only to experimentalists who want to consider potential confounds and sources of noise in findings, but also to employers whose workforce has many individual differences and

who are assigned to tasks that vary on many characteristics.

Finally, we know very little about the mechanisms that cause individuals to give up (reduce effort) when they are assigned tasks for which they lack skill and also are assigned performance-based incentives. People may have lowered self-efficacy, lowered self-set goals, or some combination thereof. In turn, lowered self-efficacy or lowered goals may decrease effort direction, effort intensity, or effort duration. Further, people may not engage in appropriate amounts of strategy development. Understanding the mechanisms that cause reduced effort could facilitate finding an appropriate remedy (such as the assignment of goals) for the giving-up phenomenon.

3.1.3. Effects of other person variables on the incentives–effort–performance relation

As mentioned earlier, there are a number of person variables that influence performance in accounting tasks. Many of these variables also may interact with incentives in affecting performance. For example, the effort and performance of high need-for-achievement (or intrinsically motivated) individuals likely is affected less positively by the presence of monetary incentives (e.g. Mawhinney, 1979). In other words, the positive incentives–effort relation could be reduced for high need-for-achievement individuals since their effort is likely to be high irrespective of the situation. Consistent with this, Atkinson and Reitman (1956) found that incentives had a positive effect on the performance of low need-for-achievement subjects, but a negative effect on the performance of high need-for-achievement subjects. Further, Vecchio (1982) found a positive effect for incentives for low need-for-achievement subjects and no effect for high need-for-achievement subjects. It is unclear, though, whether need-for-achievement (intrinsic motivation) affects the benefits that accrue from the self-selection role of contracts. Research is needed to examine this issue and, more generally, how incentives and intrinsic motivation combine to affect performance. Such research could have important implications for the design of accounting-based performance measurement and reward systems and may ultimately suggest, for example, that tasks and jobs that attract highly intrinsically motivated individuals do not require performance-based pay.

Future research also might investigate how cultural background (and its attendant values) affects the efficacy of monetary incentives. Several studies in accounting report that individuals from different cultures vary on dimensions such as the degree of individualism (versus collectivism), power distance, femininity (versus masculinity), uncertainty avoidance, and Confucian dynamism (Chow, Shields, & Wu, 1999; Harrison & McKinnon, 1999). However, prior research has not examined whether differences in these attributes actually lead individuals to respond differentially to monetary incentives. Such research is particularly important since some (shared) dimensions of culture could yield opposing predictions regarding the effects of monetary incentives, and it is theoretically unclear whether differences in cultural background will lead to differential effort responses under monetary incentives (Chow et al., 1999). Knowledge of such differences, though, could facilitate the design of (and employees' preferences for) management control systems in companies that employ culturally diverse workforces.

In summary, there are several person variables that could interact with monetary incentives to affect effort and task performance. We focus on skill because it is a key variable related to performance in accounting-related tasks. Moreover, skill can play two roles in interacting with monetary incentives—one role can attenuate a positive effort–performance relation and one role can attenuate a positive incentives–effort relation. While much has been written about the important role of skill in understanding the effects of monetary incentives, surprisingly little empirical work exists. The existing evidence suggests that skill sometimes reduces the positive effects of incentive-induced effort on performance and that highly skilled individuals frequently choose performance-based incentives when given the opportunity to do so. However, there are a number of open questions that research needs to examine to make useful suggestions for the consideration of skill (and other person variables) in choosing incentive contracts or when using incentives in laboratory settings.

3.2. Task variables

In this section, we discuss how task variables may affect the relations between monetary incentives and effort and effort and performance. Task variables include factors that vary both within and across tasks, such as complexity, effort-sensitivity, and framing (e.g. whether the situation is described as a gain or a loss). Task variables also include presentation format (e.g. whether accounting information is presented in the balance sheet or in footnotes), processing mode (e.g. whether people are asked to process information simultaneously or sequentially), and response mode (e.g. whether people are asked to respond to a question in terms of probabilities or frequencies). Finally, tasks are thought to vary as to their "attractiveness", or how interesting or fun they are perceived to be.

The importance of understanding the effects of task characteristics on performance cannot be understated. In a decision-making context, Hogarth (1993, p. 411) notes: "To understand decision making, understanding the task is more important than understanding the people." Hogarth's comment reflects several important issues. First, much research has noted that human decision-making strategies "evolve" to adapt to task demands (Anderson, 1990; Gigerenzer et al., 1999; Newell & Simon, 1972; Payne et al., 1990). Second, as Hogarth notes, research has documented surprisingly frequently that task variables explain more performance variation than key person variables. Because accounting tasks may differ dramatically from those used in psychology research due to professional standards, regulations, and other factors, it is critical to understand their characteristics and examine how they affect accountants. Consequently, numerous researchers have called for more work related to analyzing these task characteristics (Ashton & Ashton, 1995; Bonner, 1999; Gibbins & Jamal, 1993; Hogarth, 1993; Peters, 1993). Prior research in accounting has examined the effects of a number of task characteristics on task performance, including complexity (Asare & McDaniel, 1996; Simnett, 1996), framing (Kida, 1984; Lipe, 1993), order of information (Ashton & Ashton, 1988), presentation format (Maines & McDaniel, 2000; Vera-Muñoz, Kinney, & Bonner, 2001), processing mode (Ashton & Ashton, 1988; Libby & Tan, 1999), and task attractiveness (Fessler, 2000).

While there are numerous task variables that could be studied in conjunction with monetary incentives, we focus on *task complexity*. We do so for the following reasons. First, tasks in accounting settings can vary dramatically in complexity, and complexity has been posited to be one of the most important determinants of performance in accounting settings (Bonner, 1994; Hogarth, 1993). Second, recent work in accounting portrays and finds evidence consistent with task complexity being a type of incentive that accounting professionals can face, thereby suggesting the importance of studying task complexity in conjunction with monetary incentives (Das, Levine, & Sivaramakrishnan, 1998; Young, 2001). Finally, task complexity sometimes has been confused with effort-sensitivity, which is a separate characteristic of tasks that has clear importance when considering the effects of monetary incentives on performance. Consequently, we discuss the differences between these two constructs.

3.2.1. *Effects of task complexity on the incentives–effort–performance relation*

Broadly defined, task complexity refers to the amount of attention or processing a task requires as well as the amount of structure and clarity the task provides. Thus, task complexity increases as the required amount of processing increases and as the level of structure decreases (Campbell, 1988; Wood, 1986). Task complexity therefore subsumes constructs such as "task difficulty" and "task structure" in addition to the algorithmic/heuristic solution dimension of tasks discussed by Ashton (1990) and McGraw (1978) since these constructs relate to the amount and/or clarity of processing involved in a task. Given this definition, there are three roles task complexity can play in affecting task performance.

First, task complexity can decrease current effort duration and effort intensity, which can lead to decreases in performance. Second, task complexity can increase (or decrease) effort directed toward strategy development, which also can lead to decreases in short-run (or long-run) performance. Third, task complexity can attenuate the effects of

effort on performance because increases in task complexity lead to increases in skill requirements. Thus, if skill is held constant, as is the case in many experimental or other short-term situations, the gap between subjects' skill and tasks' skill requirements increases as task complexity increases, thereby making it less likely that effort will positively influence performance. Overall, then, task complexity can affect performance by decreasing current effort duration and effort intensity or increasing (or decreasing) effort directed toward strategy development, all of which can lead to reductions in short-run (and long-run) task performance. Additionally, task complexity can attenuate the relationship between effort and performance because individuals are more likely to lack skill for complex tasks.

By definition, increases in task complexity lead to increases in the effort requirements for a task (Campbell, 1988; Wood, 1986). *Ceteris paribus*, when a task's effort requirements increase, people may respond by exerting less absolute effort than they would for a simpler task. There are a number of possible explanations for this phenomenon. First, standard expected utility theory (and adaptive decision-making theory, e.g. Payne et al., 1990) suggests that, before performing a task, individuals consider the costs and benefits related to that task. Thus, persons weigh the benefits associated with increasing performance against the effort costs necessary to achieve higher performance. If the costs outweigh the benefits, then people will trade off a reduction in performance for reductions in effort. This may entail using simplified strategies or heuristics in addition to exerting less effort in terms of duration and intensity. Assuming that the benefits in terms of performance are roughly equal under simple and complex tasks, the effort costs would be more likely to outweigh the benefits in complex tasks.[22] Second, task complexity is positively related to arousal, as are incentives. Since theories posit an inverted-U relationship between arousal and effort/performance (Eysenck, 1986), the combination of incentives and a complex task could lead to a less optimal level of arousal than the combination of incentives and a simple task.[23] For these reasons, then, task complexity may attenuate a positive incentives-effort duration relation and a positive incentives–effort intensity relation.

Whether task complexity attenuates the incentives–effort relation also depends on the relative weights an individual places on good performance (expected benefits) and effort (expected costs). Incentives for good performance should increase the relative weight placed on good performance. However, whether expected benefits then outweigh expected costs for complex tasks likely depends on the individual's belief that he or she can perform well by exerting additional effort. In other words, the individual's perception of his or her skill or, more generally, his or her self-efficacy likely influences the benefits a person expects from good performance. As skill and self-efficacy increase, people are more likely to believe that they can attain the expected benefit (the incentive payment) for a complex task, thereby increasing the expected (value of the) benefit and the likelihood that task complexity will not attenuate the incentives–effort relation.

However, task complexity also can affect self-efficacy. Task complexity can make self-efficacy more difficult to assess, making it more variable than it would be with a simple task (Gist & Mitchell, 1992). Further, because some individuals will recognize that task complexity decreases performance capabilities, ceteris paribus, self-efficacy may decrease. In other words, as skill increases, self-efficacy will increase and the expected benefits for good performance in a complex task will outweigh the expected costs of obtaining good performance. Consequently, the attenuating effect of task complexity on the incentives–effort relation-

[22] This is an important assumption that may not hold in many settings as the rewards for performing well at complex tasks often exceed those for performing well at simple tasks. For example, the relative magnitude of CEO compensation to average employee compensation (Crystal, 1991) likely reflects, among other things, differential complexity of tasks performed by these individuals. At some point, then, higher rewards for complex tasks (vis-à-vis simple tasks) outweigh the higher cost of exerting effort in these tasks. Consequently, the incentives–effort relation would not be attenuated.

[23] An alternative conceptualization is that, as task complexity increases, the gap between performance capability and task demands rise, giving rise to stress, which is presumed to have a negative effect on effort and performance.

ship ultimately will decrease. However, this reduction may be offset by decreases in self-efficacy due to task complexity itself.

Overall, then, increases in task complexity are posited to attenuate the positive incentives–effort relation, unless subjects have high self-efficacy (which should, at least partially be based on their actual skill). We expect to observe this attenuation in most experimental or other short-run settings. Experimenters typically recruit college student subjects whose skills are relatively constant; these subjects do not have the opportunity to acquire skills during the course of the experiment. In other short-run settings, people may not have the opportunity to acquire many skills simply because of time constraints. Since skill requirements (along with effort requirements) increase as tasks become more complex (Bonner et al., 2000; Campbell, 1988; Locke & Latham, 1990; Wood, 1986), having subjects or employees whose skills are effectively constant decreases the probability people have requisite skills when complexity increases. In turn, this means their self-efficacy should remain low.[24]

A second response to increases in task complexity could be to engage in more strategy development than would be the case for simple tasks. This could occur because people recognize that complex tasks require complicated strategies for good performance (Locke & Latham, 1990). However, such effort directed toward strategy development could decrease performance in the *short run* because people change strategies quite frequently in order to find an appropriate strategy, thereby often employing strategies that are not appropriate (e.g. Naylor & Clark, 1968; Naylor & Dickinson, 1969; Naylor & Schenk, 1968). In the *long run*, effort directed toward strategy development could enhance performance because it ultimately creates greater knowledge (e.g. Campbell & Ilgen, 1976; Creyer et al. 1990; Sprinkle, 2000). On the other hand, if the rewards from successful performance are held constant, people may engage in less strategy development as task complexity increases because the costs of engaging in strategy development increase as complexity increases. If individuals respond to task complexity in this way, their performance likely will suffer in both the short run and the long run.

The third possible effect of task complexity on performance occurs because increases in task complexity lead to increases in skill requirements in addition to increases in effort requirements. Consequently, in settings like laboratory experiments, subjects are less likely to have the skills needed for complex tasks than for simple tasks. If subjects are less likely to have the skills necessary for good performance in complex tasks, even if monetary incentives increase current effort, then increases in effort may not translate into performance increases. Thus, for example, if subjects have high self-efficacy because they have difficulty determining that they actually lack skills for complex tasks (Gist & Mitchell, 1992), incentive-induced effort likely will not have a positive effect on performance. So, the gap between the skills required by complex tasks and the skills people have may reduce the effects of incentives on performance either by reducing self-efficacy and, thus, effort, or by reducing the effects of effort on performance. Because self-efficacy is affected by a number of factors (Bandura, 1997), it is quite conceivable that subjects lacking skills for complex tasks could have widely varying levels of self-efficacy and effort.

Note that the typical prediction of all the theories above is that increases in task complexity will decrease a positive effect of incentives on performance, either by attenuating the incentives–effort relation or by attenuating the effort–performance relation. The exception to this prediction is when both self-efficacy and actual skill (including existing strategies) are at a high enough level to overturn these negative effects. Findings from laboratory studies that use both across-task and within-task definitions of task complexity are consistent with this typical prediction. For example, in a study that defined complexity across broad categories of tasks, Bonner et al. (2000) found that the probability that incentives positively affect performance decreases as complexity increases. The results of

[24] We discuss empirical findings after discussing theories about task complexity–incentives interactions as the studies in this area have not directly addressed the specific mechanisms by which task complexity interacts with incentives. Thus, their findings are compatible with more than one of the theories advanced here.

studies manipulating task complexity within the context of a single task are similar. Specifically, Glucksberg (1962) manipulated task complexity in two experiments. In each experiment, incentives had a positive effect on performance in the easy version of the task but a negative effect on performance in the complex version. Similarly, Pelham and Neter (1995) found that subjects with the easy version of a task performed better with incentives, while those subjects with the complex version did not. Finally, Wright and Aboul-Ezz (1988) found that incentives had a greater positive effect in simple tasks than in more complex tasks.

None of these studies measured skill, self-efficacy, goals, arousal (stress), or any dimensions of effort, although we do know that meta-analyses of the effect of task complexity in the positive relations between, respectively, self-efficacy and goal setting and performance find that the effects of these factors decrease as task complexity increases (Stajkovic & Luthans, 1998; Wood et al., 1987). Further, theory and much empirical evidence suggests that the positive effects of arousal decrease as task complexity increases (Eysenck, 1986). Overall, then, it appears that incentives are less likely to positively affect performance as task complexity increases, at least in short-duration studies in which subjects have little to no experience with the task and thus lack requisite skills.

The two accounting studies that appear to bear on the interaction of task complexity and incentives, however, find results that seem contradictory to those above. We believe that this is because these studies address variables other than task complexity. First, Libby and Lipe (1992) examined the effect of incentives on recall and recognition of internal controls and found that incentives had a greater effect on recall performance than on recognition performance. They hypothesized that this occurred because recall is more sensitive to effort than is recognition, but also noted that recall is a less structured (more complex) task, implicitly suggesting that incentives have a *greater* positive effect in more complex tasks. We suggest that the recall versus recognition manipulation is a manipulation of the effort–sensitivity of the task, and that it does not speak to task complexity issues. Both the recall and recognition tasks employed by Libby and Lipe were relatively simple memory tasks for which subjects possessed some prior knowledge (and, to the extent they did not, incentives had a lessened effect). Task complexity and effort sensitivity may be related when subjects do not possess skill or when tasks are far more sensitive to skill variations than to effort variations. In these situations, complex tasks would be less effort sensitive because subjects simply cannot do the task regardless of the level of effort they exert. When subjects possess skill or when tasks are sensitive to both effort and skill variations (as in Libby & Lipe), however, the relation of complexity to effort sensitivity is not clear.

The second accounting study that could be interpreted as providing contradictory findings about the role of task complexity in the incentives-effort or effort-performance relations is Ashton (1990). In this study, auditors (who likely had little skill with regard to the task—see Heiman, 1990), provided bond ratings either with or without a decision aid and with or without incentives. The aid can be construed to be a manipulation of task difficulty, which is an element of complexity, with the presence of the aid making the task more difficult (Heiman, 1990). Using this interpretation, the incentive effect is consistent with the results described above—incentives had a positive effect in the simpler version of the task (that without the aid) and no effect in the more difficult version of the task (that with the aid). However, this interpretation is problematic because the aid had a positive effect on performance; this would suggest that the aid made the task less difficult rather than more difficult. An alternative interpretation, discussed by Heiman (1990), which seems more likely, is that the aid increased arousal in that it provided a very difficult performance goal that subjects tried to surpass when faced with incentives. This additional arousal (beyond that provided by incentives) may have led to the failure of incentives to increase performance with the aid. We discuss this interpretation further in the environmental variables section.

While the evidence to date is fairly consistent in suggesting that task complexity reduces the effect of incentives on performance, we know very little about how and under what conditions this occurs.

For example, the studies that have examined this issue have been very short in duration. It is not clear what will happen when studies increase in length because, for example, while subjects may have the opportunity to acquire skill, task complexity itself may reduce self-efficacy, so that subjects still are not willing to exert additional effort under incentives. Further, longer-duration settings common to most accounting-related jobs may lead to more arousal or stress, so that the combination of complex tasks and incentives could make performance worse in the long run while subjects engage in "too much" strategy development. Additionally, other distinct features of accounting settings such as the presence of accountability may create additional arousal or stress (Ashton, 1990).

On the other hand, increases in self-efficacy through the acquisition of skill could mitigate decreases in self-efficacy from task complexity and/or arousal/stress due to the task complexity-incentives combination, so that incentives can positively influence effort. Further, distinct features of accounting settings such as the review process also may affect key intervening variables such as self-efficacy by providing clear performance capability information. Additionally, while task complexity may reduce effort, it could in fact lead to strategies that improve performance for many individuals. For example, research shows that inexperienced financial analysts are more likely to conform to a consensus earnings forecast than more experienced analysts (Hong, Kubik, & Solomon, 2000). This finding is consistent with their believing that increased effort may not lead to better performance and simply reducing their effort to make an earnings forecast similar to that of others. More importantly, research also has found that this behavior is consistent with self-interest. Inexperienced analysts who make forecasts far from the consensus are more likely to lose their jobs than more experienced analysts who make such "bold" forecasts (Hong et al., 2000), suggesting that at least firms view their conformity as "better performance."

One assertion that seems relatively clear is that, when considering the effects of task complexity on the incentives–effort and effort–performance relations, one also must consider issues related to skill. Consequently, many of the questions we raised related to skill and incentives also are pertinent here. In particular, when designing reward systems for employees who perform complex tasks, organizations need to consider whether rewards linked to performance in the short run are wise if they wish to encourage learning over time. This may be a particular problem in situations where accounting data are used to measure performance. Another question that arises in this area is how effort-sensitivity and task complexity differ, and how these differences affect predictions about the effects of tasks on the incentives–performance relation. Tasks in accounting vary both as to effort sensitivity and task complexity, so further work explicating these constructs could be very useful. Again, as is the case with many other variables, we know virtually nothing about the processes by which task complexity can affect the incentives–performance relation. Understanding these processes is critical to suggesting solutions for poor performance. For example, mechanisms that tend to increase self-efficacy such as persuasion could be used to offset the negative effects of task complexity on self-efficacy (if this is indeed the mechanism by which task complexity operates to reduce the effectiveness of incentives).

Another interesting issue to pursue is the idea that task complexity may actually serve as an incentive itself in some accounting-related fields. Das et al. (1998) argue that, because companies with low earnings predictability are difficult to make earnings forecasts for, analysts have an incentive to make optimistic forecasts (forecasts that are too high) in order to curry favor with management. In turn, management will provide them with more information than analysts issuing less optimistic forecasts and their forecasts will be more accurate (despite the bias). The incentive argument derives from the following assumptions: (1) analysts' performance is at least partially judged on their accuracy, (2) getting more information from management will lead to greater accuracy, and (3) management prefers optimistic forecasts. While there is some evidence to support the first assumption (Mikhail, Walther, & Willis, 1999), there is little evidence supporting the second. Further, there is some evidence that goes contrary

to the third (Brown, 1999). Nevertheless, the idea that task complexity can serve as an incentive in this situation deserves further attention.

3.2.2. Effects of other task variables on the incentives–effort–performance relation

Task complexity, when broadly defined, subsumes two key dimensions of accounting information: amount and clarity. Another dimension on which accounting information can vary dramatically is the manner in which it is presented, including the framing of items. This issue is important in many accounting contexts. For example, one of the principal tasks of the Financial Accounting Standards Board is to determine the presentation of financial information. In management accounting and auditing, there are several situations in which information can be framed differently such as variance investigation (e.g. Lipe, 1993) or going-concern judgments (Kida, 1984).

While we are not aware of any studies examining the interaction of incentives and presentation format or framing, the literature on preference reversals offers some clues as to predictions (see Thaler, 1992 for a review). Preference reversals occur when people's expressed preferences for one item of two (typically a hypothetical monetary gamble) reverse when the problem is presented in a different way. Prospect theory (Kahenman & Tversky, 1979) suggests that these reversals and other similar phenomena reflect the fact that people think about financial outcomes in terms of gains or losses vis-à-vis a reference point as opposed to ultimate wealth positions. In turn, problems that elicit thinking in terms of gains versus losses lead to different responses. This way of thinking appears to be relatively "hardwired." Consequently, we would expect that framing or presentation of information could attenuate the positive relation between incentives-induced effort and performance, specifically because while people may try harder, their way of thinking likely will not change. Consistent with this, attempts to reduce preference reversals with incentives have not been effective (e.g. Grether & Plott, 1979).

Other presentation format or framing effects may occur because, similarly, they tap into relatively "hardwired" (automatic) cognitive processes. For example, Hopkins (1996) finds presentation format effects that are due to differential categorization of accounting information. Categorization is one of the most fundamental cognitive processes and people appear to be naturally inclined to categorize items in certain ways, such as by cause rather than effect (Lien & Cheng, 1990; Nelson et al., 1995). However, many categories in accounting settings are artificial and are learned through training and experience. This suggests that, over the long run, incentives might be effective in eliminating task performance problems related to framing or presentation format variation. The key issue here is determining which cognitive process the presentation format taps into and to what extent this cognitive process is amenable to changes that can come about through incentive-induced effort.

Finally, tasks of interest to accounting researchers and organizations naturally vary, for example, from more aversive factory work to more interesting strategic cost management or resource allocation decisions. Deci and his colleagues (Deci, Betley, Kahle, Abrams, & Porac, 1981; Deci & Ryan, 1985), as well as others (e.g. Kohn, 1993), have proposed that financial incentives can harm performance in tasks that are inherently attractive (or interesting) rather than enhancing performance as would likely be the case with aversive (or boring) tasks. This hypothesis is based on the notion that extrinsic sources of motivation such as financial incentives rob subjects of the intrinsic motivation they initially have for these tasks. Since intrinsically motivated behavior is posited to result in more creativity and flexibility in decision-making than extrinsically motivated behavior, extrinsic incentives may actually degrade effort and performance.

Most of the studies in this paradigm have focused on changes in intrinsic motivation by examining the time subjects spend on the task during a "free choice" period, which occurs after subjects have performed the task under incentives. This behavior is then compared to their pre-incentives behavior or to the behavior of a control group with no incentives. While some studies document negative effects of incentives on intrinsic motivation, other studies show opposite results

(e.g. Farr, 1976; Scott, Farr, & Podsakoff, 1988; Wimperis & Farr, 1979). More importantly, recent reviews of this literature indicate that incentives do not have differential effects on task performance when the task is interesting versus boring (Cameron & Pierce, 1994; Jenkins et al., 1998; Rummel & Feinberg, 1988; Tang & Hall, 1995; Wiersma, 1992). That said, recent research in accounting suggests that monetary incentives may reduce intrinsic motivation (effort) and performance on tasks viewed as attractive and that require some level of creativity or innovation (Fessler, 2000). More research is clearly needed, though, to sort out the relations among incentives, task attractiveness, intrinsic motivation, effort, and performance.

To summarize, there are many task variables that could interact with monetary incentives to affect effort and task performance. We concentrate on task complexity because it is a key variable related to performance in accounting-related tasks, and it appears to decrease the effectiveness of incentives. Moreover, task complexity can play multiple roles in interacting with monetary incentives, although very few studies have addressed these roles specifically. Further, the specific mechanisms by which task complexity interacts with incentives and under what circumstances this occurs remain largely unexplored.

3.3. Environmental variables

Environmental variables include all the conditions, circumstances, and influences surrounding a person who is performing a particular task (Bonner, 1999). These variables include factors such as time pressure, accountability relationships, assigned goals, and feedback. A firm's accounting system also can be viewed as an environmental variable and, to this end, much research in accounting focuses on whether and how the environmental variables associated with accounting settings affect task performance. For example, accounting researchers have examined, either in isolation or in conjunction with other person, task and environmental variables, how factors such as time pressure (McDaniel, 1990; Spilker, 1995), accountability (Kennedy, 1993, 1995; Peecher, 1996), assigned goals (Chow, 1983; Hirst & Yetton, 1999), features of the regulatory environment (Hronsky & Houghton, 2001), and feedback (Briers, Chow, Hwang, & Luckett, 1999; Frederickson et al., 1999; Jermias, 2001) affect task performance.

Monetary incentives not only are an important part of management control systems but also can be viewed as an environmental variable. Thus, their efficacy in motivating effort and performance has been studied extensively in accounting and other disciplines. However, monetary incentives are only one of many environmental variables that may enhance (or detract from) motivation and performance. Thus, it is important to examine whether there are dependencies among these variables, and whether salient accounting-related environmental variables serve as complements to (or substitutes for) incentive compensation.

There are numerous environmental variables that may interact with monetary incentives in affecting task performance. Similar to the person and task sections, we primarily devote our attention to environmental variables that are important in accounting settings and that have been studied in combination with monetary incentives. In particular, we focus on assigned goals. Goals are important to accountants because, similar to incentive compensation, they are thought to be an important element of an organization's control system (Merchant, 1998). Specifically, organizations continuously develop and revise performance targets and employ both short-term and long-term goals to reach these targets (Locke & Latham, 1990; Merchant, 1998; Shields, 2001). For example, many firms develop financial budgets that contain explicit return-on-investment goals, sales-revenue goals, and production-cost goals. The goals (standards) contained in these budgets frequently are used as benchmarks in evaluating the performance of, and therefore to motivate, employees (Merchant, 1998; Shields, 2001).

3.3.1. Effects of assigned goals on the incentives–effort–performance relation

Several studies have manipulated assigned goals alone or in conjunction with monetary incentives. Similar to monetary incentives, assigned goals and performance targets are thought to positively

influence effort direction, effort duration, and effort intensity and, as a result, improve performance (Earley & Lituchi, 1991; Locke & Latham, 1990; Meyer, Schacht-Cole, & Gellatly, 1988). Assigned goals have been shown to positively influence effort through two mechanisms. First, assigned goals affect the level of personal (self-set) goals, which in turn, positively influences the various dimensions of effort. Second, assigned goals positively affect self-efficacy and, in turn, self-efficacy has (as discussed earlier) a positive influence on both personal goal levels and the various dimensions of effort.[25] Locke and Latham (1990) note that these effects of assigned goals on effort direction, duration, and intensity are relatively automatic once individuals accept goals. They further suggest that, under some circumstances, goals can positively affect effort directed toward strategy development.

Moreover, in contrast to predictions from neoclassical economic (agency) theory that goals per se do not affect effort and performance, there are a large number of empirical studies and meta-analyses indicating two key findings about the effects of goals (Latham & Locke, 1991; Locke & Latham, 1990; Tubbs, 1986). First, the level of difficulty of the assigned goal is positively related to performance, until goals become excessively difficult, at which point performance levels off. The explanation for this goal-difficulty effect is that goal levels are positively correlated with effort intensity and effort duration (effort direction is fixed once a goal has been accepted). Here, Locke and Latham (1990) note that more difficult goals may set a higher standard for people's satisfaction with their performance; this standard may contribute to or explain the effects of difficult goals on effort intensity and duration. Second, specific (quantitative) difficult goals lead to higher effort and performance than vague difficult goals such as "do your best" or than no assigned goals, which often are assumed to be implicit "do your best" goals.

For this latter effect, Locke and Latham (1990) offer two explanations. First, specific goals likely positively influence effort direction. Second, they posit that there is substantial variation in the performance levels at which people will be satisfied with their performance under "do your best" goals versus specific, difficult goals. Consequently, there also will be substantial variation in effort duration or intensity among individuals with "do your best" goals, and there will be lower variation in effort among people with specific, difficult goals who are attempting to attain a high level of performance. Increased variation among the "do your best" group implies a lower mean of effort in this group because the effort level of people with specific, difficult goals is uniformly high. Consistent with this, many studies have shown that the effects of specific, challenging goals lead to greater effort duration and/or effort intensity and greater performance than "do your best" goals (Locke & Latham, 1990; Tubbs, 1986).

Like assigned goals, monetary incentives can affect effort direction, duration, and intensity, as well as strategy development. In other words, both monetary incentives and goals are motivational techniques. A simple hypothesis about the joint effects of monetary incentives and goals, then, would be that assigned goals have additive positive effects on effort and performance over monetary incentives and not interactive effects (e.g. Locke, Shaw, Saari, & Latham, 1981).

Empirical results tend to support this hypothesis—numerous studies show that monetary incentives and assigned goals generally have additive effects on performance (e.g. Campbell, 1984; Latham, Mitchell, & Dossett, 1978; Locke, Bryan, & Kendall, 1968; London & Oldham, 1976; Pritchard & Curtis, 1973; Terborg & Miller, 1978). In other words, on average, assigned goals and monetary incentives have independent, positive effects on performance. The broad implication of this research for accounting is that goals and incentives are not substitutes, therefore suggesting that organizations should employ performance targets in conjunction with financial incentives to best motivate their employees.

[25] The positive effect of assigned goals on self-efficacy occurs because assigned goals (vis-à-vis no goals) provide normative information about the level of performance people can be expected to reach in a particular setting. This normative information positively affects self-efficacy (Locke & Latham, 1990; Meyer & Gellatly, 1988).

The findings of recent research, however, raise an important question regarding a possible interaction between goals and incentives. Specifically, what are the effects on effort and performance when monetary incentives are linked to goal (standard) attainment versus when incentives and goals are kept as separate motivating mechanisms? Some incentive schemes, such as budget-based (quota) schemes, explicitly include assigned goals and link compensation to achieving these goals. Such compensation schemes typically pay individuals a flat wage up to some targeted level of performance, then either a bonus for reaching the target or a piece rate for each additional unit of output above the target. Alternatively, other incentive schemes, such as piece-rate or profit-sharing schemes, need not (and frequently do not) include either an explicit or implicit goal because compensation is linked to each unit of output. However, independent performance goals can be assigned to employees when they are working under these types of schemes.

A recent review of incentives experiments found that incentive schemes that include an explicit assigned goal tend to lead to higher performance than incentive schemes that do not include an explicit goal (Bonner et al., 2000). This result may occur because budget-based (quota) incentive schemes include *both* an explicit goal and an explicit link between pay and performance, whereas other incentive schemes usually only include the pay-for-performance link. What this review does not tell us, however, is whether incentive schemes that embed goals (e.g. budget-based schemes) are superior to situations in which employees are provided with explicit goals *and* performance-contingent incentives that are not explicitly linked to achieving these goals. Further, this review does not address the dimensions of assigned goals that may create or alter any observed interactions between goals and incentives, such as their level of difficulty. Finally, it does not address the cognitive and motivational mechanisms by which this result occurs.

A few empirical studies have attempted to address these issues. For example, Fatseas and Hirst (1992) and Lee et al. (1997) found that subjects working under a quota scheme performed better than subjects working under piece-rate or flat-rate schemes when goals were easy or moderate.[26] However, when the goal became very difficult, both Fatseas and Hirst (1992) and Lee et al. (1997) found that the quota scheme resulted in significantly lower performance than piece-rate or flat-rate schemes. Lee et al. (1997) found that these results were accounted for by personal goals and self-efficacy, but not by goal commitment.

Other studies have examined additional issues related to a possible goal-monetary incentives interaction. For example, Wright (1992) found a three-way interaction among incentive schemes, level of pay, and goals. In particular, subjects with the high level of the quota scheme outperformed subjects with the high piece-rate scheme at both easy and moderate goals; piece-rate subjects did better at the difficult goal level. Subjects with the low quota scheme, however, performed worse than low piece-rate subjects at all goal levels. This study also found that the results were partially explained by goal commitment, and other similar studies have found that incentives tied to goals (quota schemes) can result in lower personal goals and lower self-efficacy than do incentives not tied to goals (piece-rate schemes) (Wright, 1989; Wright & Kacmar, 1995).

Ashton (1990) examined the interaction between a decision aid that implied a difficult goal and monetary incentives. When subjects did not have the decision aid, performance with incentives was

[26] In the goal-setting literature, goal levels frequently are defined by reference to a pilot test of similar subjects. For example, in Fatseas and Hirst (1992) the "low", "moderate", and "difficult" goals were set at a level such that, a priori, subjects had an 80% (20th percentile on pilot test), 50% (50th percentile on pilot test), or 20% (80th percentile on pilot test) chance, respectively, of achieving them. Goal levels also have been defined by reference to each individual subject's performance in a practice session. For example, in Erez et al. (1990) the "easy", "moderate", and "difficult" goal levels were set by having each subject perform at the 20th, 50th, and 80th percentiles of their own distribution of performance in the practice session, respectively. Moreover, a typical (but by no means widely accepted) definition of low, moderate, and difficult goals seems to be around the 20th, 50th, and 80th percentile of performance. Additionally, when linking compensation to goal attainment, as under a quota scheme, these studies do not increase the level of rewards as goal difficulty increases. Thus, raising the goal reduces the expected payoff associated with a given level of effort under a quota scheme.

better than performance without incentives; when they had the decision aid with the difficult goal, subjects with incentives performed no better than those without incentives. Erez, Gopher, and Arzi (1990) examined the interaction between the presence of a goal-based incentive and whether goals were assigned or self-selected. Results indicated an interaction due to subjects with incentives performing the same when they had assigned or self-set goals, but subjects without incentives performing better with self-set goals. This interaction occurred only at the moderate goal level, however. At the easy goal level, neither incentives nor assignment of goals had an effect on performance. At the high goal level, these factors had main effects, but no interactive effects.

Overall, it appears that while early studies indicated no interaction between goals and incentives, more recent studies that examine various dimensions of goals and/or incentives find such interactions. The strongest evidence suggests an interaction between goal difficulty (when goals are specific) and the type of performance-contingent incentive scheme. Specifically, while performance tends to increase as specific goals increase under piece-rate schemes, performance initially increases, but then decreases, as goals increase under quota schemes. This interaction typically results in performance that is better under piece-rate schemes than quota schemes when goals are very difficult, but performance that is better under quota schemes (than piece-rate schemes) when goals are moderate. There also may be an interaction between goal level and incentive magnitude, as well as a three-way interaction involving these factors and type of scheme. Finally, there may be interactions that involve whether goals are assigned or self-set. Evidence on the mechanisms by which these interactions affect performance is limited to personal goals, goal commitment, and self-efficacy, and these results are mixed. Further, none of the studies has examined the various dimensions of effort.

The results described above are quite limited as to the dimensions of goals and incentives examined and, further, the findings are not uniform. Consequently, drawing conclusions about the best combination of goals and incentives would be premature. For example, Lee et al. (1997) note that concluding that the best incentive system would be a quota scheme embedded with moderate goals is dangerous from the standpoint that it is difficult to maintain goals as "moderate" over time due to learning and other factors.

Future research directed toward examining how goals and incentives should be employed in tandem to achieve maximal effort and performance from individuals could provide several useful insights on a number of issues of practical and theoretical importance to accounting. First, such research could inform us of whether compensation should be tied to meeting performance targets or whether goals and incentives should be independent. Second, research could inform us about important nonlinearities in such goal-incentive combinations (such as those related to goal level and pay level) and, thus, where the benefits accruing to these combinations start, stop, diminish, or change sign. As discussed by Luft and Shields (2001a), there can be important theoretical and practical reasons for examining whether nonlinear relations exist. Such research also is valuable because the exact level of goal difficulty that maximizes performance is ambiguous (Hirst & Yetton, 1999; Shields, 2001). Along with this, prior research has not examined possible interactions among incentives and non-specific goals, such as "do your best" goals. Because of the possible problems with keeping specific goals at certain levels of difficulty, such research could have substantial practical significance.

Finally, research could provide more insight into the mechanisms by which incentives and goals combine to influence performance since the results to date focus mostly on their effects on personal goals and goal commitment. For example, if the combination of difficult assigned goals *and* quota schemes leads to lowered personal goals, does this translate into people "giving up" (e.g. decreasing effort intensity, direction, or duration)? Alternatively, do people who have difficult assigned goals and incentives tied to those goals maintain high personal goals and goal commitment, thus not "giving up," but instead engage in ineffective strategy development under the high pressure to perform well? It is important to understand these

mediators of goal-incentive interactions because there may be very simple solutions to problems caused by particular combinations. For example, some research indicates that incentives can increase goal commitment (see Locke & Latham, 1990 for a review), so there may be some level of incentives at which the negative effects of difficult goals on personal goals (and self-efficacy and effort) can be eliminated.

3.3.2. *Effects of other environmental variables on the incentives–effort–performance relation*

As previously discussed, there are numerous other environmental variables that can influence performance in accounting-related tasks. For example, feedback (information provided to a person regarding some aspect of his or her task performance) is an integral component of accounting because a fundamental role of accounting information is to facilitate individual and organizational learning (Atkinson et al., 2001; Sprinkle, 2000, 2001). Further, accounting methods can drastically alter both the amount and type of feedback users of accounting information receive and, as a result, feedback can vary greatly across accounting settings (e.g. Luft & Shields, 2001b).

While monetary incentives and assigned goals theoretically are posited to have only motivational effects, feedback has been posited to have both cognitive effects (learning) and motivational effects (e.g. Kessler & Ashton, 1981; Nelson, 1993). Specifically, in their meta-analysis, Kluger and DeNisi (1996) note that feedback has been shown to positively affect motivation and learning as well as other factors such as self-efficacy. The most typical predicted effect of feedback is that it tends to increase the various dimensions of effort, the ability to learn and, consequently, enhances performance (e.g. Ashford & Cummings, 1983; Pritchard, Jones, Roth, Stuebing, & Ekeberg, 1988). In many cases, however, feedback has no apparent effect on performance (e.g. Kluger & DeNisi, 1996; Locke, 1967) and, in some cases, even debilitates performance (e.g. Jacoby, Mazursky, Troutman, & Kuss, 1984; Kluger & DeNisi, 1996). Moreover, the motivational and cognitive effects of feedback can interact. Thus, it is unclear whether feedback has additive or interactive effects with monetary incentives.

Most empirical evidence tends to show that feedback does not interact with incentives in affecting task performance (e.g. Arkes, Dawes, & Christensen, 1986; Chung & Vickery, 1976; Hogarth, Gibbs, McKenzie, & Marquis, 1991; Montague & Webber, 1965; Phillips & Lord, 1980; Sipowicz, Ware, & Baker, 1962; Weiner, 1966; Wiener, 1969; Weiner & Mander, 1978). Further, Kluger and DeNisi's (1996) meta-analysis found that monetary incentives do not moderate the effect of feedback. In short, prior research suggests that incentive and feedback effects, when they exist, typically are independent and additive so that there is no simple two-way interaction.

In these prior studies, however, feedback was automatically provided to experimental participants and, thus, there was no cost to acquiring feedback. Recent research in accounting shows that monetary incentives can motivate individuals to both acquire and use feedback to improve long-run task performance (Sprinkle, 2000). One implication of this research for accounting is that monetary incentives and feedback can be complements. Organizations not only need to provide information that is valuable for decision making, but also need to employ monetary incentives to ensure that people actually use this information (feedback) to enhance learning and improve organizational performance.

Much future research is needed, though, to fully understand how feedback and monetary incentives combine to affect effort and performance. For example, there are various types of feedback in accounting settings, including outcome feedback, cognitive feedback, and task-properties feedback (Kessler & Ashton, 1981). Further, such feedback can have differential effects on individuals' abilities to learn and, presumably, their motivation/effort (Balzer, Doherty, & O'Connor, 1989; Bonner & Pennington, 1991; Bonner & Walker, 1994; Kluger & DeNisi, 1996). To date, though, studies examining the effects of monetary incentives and feedback have employed only outcome feedback and, consequently, we know little about how cognitive feedback or task-properties feedback affect the relations between incentives and effort and effort and performance. Additionally, since feedback can increase the degree of information

asymmetry between employees and employers, it may provide a means for employees to shirk more effectively (Baiman & Sivaramakrishnan, 1991) and monetary incentives can exacerbate this motivation. Moreover, since a primary goal of accounting is to provide information (feedback) for decision-making, it is important to understand when and how incentives motivate individuals to use feedback from accounting systems to the benefit or detriment of the organization.

In addition to assigned goals and feedback, there are other important accounting-related environmental variables that should be studied in conjunction with performance-contingent monetary incentives. Such variables include training, accountability, the assignment of decision rights, and time pressure. For example, training typically is intended to increase the skill level of individuals (Anderson, 1995), and much of accounting education and instruction is directed toward increasing the skill level of individuals or helping individuals better deploy their existing skill (Bonner & Pennington, 1991; Bonner & Walker, 1994). If training enhances skill (and skill and effort are complements to some extent), then we might expect that training would interact with incentives in the same manner that skill is proposed to interact with incentives. That is, the positive effect of monetary incentives on performance would increase as skill-related training increases.

Compared to goals and feedback, far fewer studies have examined the combined effects of training and performance-contingent monetary incentives. Further, existing empirical findings (e.g. Arkes et al., 1986; Baker & Kirsch, 1991; Gigerenzer, Hofrage, & Kleinbolting, 1991) almost uniformly show that training does not interact with incentives to affect task performance.[27] In our view, though, the prior research in this area does not provide a good test of whether training interacts with incentives. In particular, the studies by Arkes et al. (1986) and Gigerenzer et al. (1991) provide no evidence that the training actually enhanced skill. Further, the task employed by Baker and Kirsch (1991), immersing one's hand in ice water for as long as possible, appears to be far more sensitive to effort than to skill, so that training likely did not have much of an effect on performance (Baker & Kirsch, 1991, p. 508). In short, we feel that much additional research is needed to understand how training and monetary incentives combine to affect performance, especially since training is thought to be a significant determinant of performance in many accounting-related tasks (Libby & Luft, 1993).

There are several other key environmental variables such as accountability and the assignment of decision rights that have not been studied in conjunction with financial incentives. This is unfortunate since, similar to performance-contingent monetary incentives, these variables can be viewed as motivating mechanisms, and it is unclear whether they will have interactive or additive effects with incentives (see also Pelham & Neter, 1995 for other variables). Future research is clearly needed to document the exact nature of these relations as well as the underlying motivational and cognitive processes governing these relations. Given that significant dependencies may exist among accounting-related environmental variables, it is important to understand how they combine to affect task performance (Libby & Luft, 1993). Finally, as articulated by Libby and Luft (1993), often the key to understanding these dependencies is to understand the mechanisms that determine task performance.

3.4. Incentive scheme variables

In this section, we discuss how various dimensions of the incentive scheme per se may affect the relations between (the presence of) monetary incentives and effort and effort and task performance. Incentive scheme variables include, for example, the timing of the incentive, whether it embodies competition, what dimension(s) of

[27] One could consider the results from binary outcome prediction studies by Siegel (1961) and Tversky and Edwards (1966) to be the exceptions. Specifically, in a task where subjects are asked to predict which one of two lights will illuminate over a series of hundreds of trials, subjects receiving performance–contingent incentives are, once trained regarding the Bernoulli process which govern the lights, more likely to employ the optimal rule of choosing the signal with a higher probability more frequently rather than perform probability matching. Thus, subjects receiving incentives are more likely to use a decision rule to enhance performance than subjects not receiving incentives.

performance the incentive rewards, and payoff magnitude. Incentive scheme variables also include whether the incentive contract is assigned or self-selected and whether the incentive contract incorporates assigned goals. These latter elements were discussed previously under the person variables and environmental variables sections, respectively.

Several studies in accounting have focused on whether and how dimensions of the incentive scheme itself affect task performance and the underlying cognitive and motivational factors by which these dimensions determine task performance. For example, researchers in accounting have examined the effects on performance of: (1) the type of incentive scheme (Bonner et al., 2000; Frederickson, 1992), (2) the timing of the incentive (Libby & Lipe, 1992), (3) the framing of the incentive contract in bonus or penalty terms (Luft, 1994), (4) the magnitude of the incentive (Hannan, 2001), and (5) the assignment versus self-selection of the incentive scheme (Chow, 1983).

Such research is important in accounting because accountants not only play a major role in designing compensation plans but also in determining the specific attributes of these plans (e.g. Atkinson et al., 2001; Indjejikian, 1999). Thus, accounting research directed toward understanding how properties of incentive schemes affect effort and performance can help uncover the characteristics of incentive schemes that best align the employees' interests with those of the organization and, therefore, can help determine the most effective compensation arrangements. Further, in designing effective incentive schemes, it is beneficial to understand the relations among incentive scheme variables and the cognitive and motivational processes that affect task performance. For example, research may show that while a particular incentive scheme increases effort duration and task performance, the cost to the firm associated with achieving this effort increase exceeds the benefit from improved performance (also see Luft, 1994).

There are numerous incentive scheme variables that could be studied. Similar to prior sections, we restrict our primary focus to one of these variables and discuss others briefly. Specifically, we discuss the performance dimension that the incentive scheme rewards. We do so because employees usually perform several different tasks as part of their jobs or a single task with several dimensions of performance (e.g. Feltham & Xie, 1994; Hemmer, 1996; Holmstrom & Milgrom, 1991). For instance, production employees frequently are responsible for both the quantity and quality of output. In such settings, a fundamental role of accounting is to design a set of performance measures that best reflect firm value and employees' contributions to firm value. The accounting performance measurement and reward system also needs to consider how the measured dimensions of performance will objectively (or subjectively) be used in evaluating employees and, thus, whether an employee's financial compensation will be linked to each performance measure. Finally, the compensation weights assigned to each performance measure need to be specified.

3.4.1. Effects of the rewarded dimension of performance on the incentives–effort–performance relation

The potential role of monetary incentives in a situation where multiple dimensions of performance (or multiple tasks) exist is twofold. First, similar to a one-dimensional setting, incentives presumably serve a role in motivating high levels of effort (Holmstrom & Milgrom, 1991; Merchant, 1998). Second, incentives are posited to serve an informational role and, thus, are thought to be important in directing employees' effort toward their various responsibilities (Holmstrom & Milgrom, 1991; Merchant, 1998). In both roles, economic theory informs us that appropriate incentives need to be provided on each task or dimension thereof in order to induce employees to optimally allocate their effort among their various responsibilities (e.g. Prendergast, 1999).

It frequently is very difficult, however, to measure all dimensions of performance with equal precision and, consequently, theory suggests that, given employees' aversion to risk, it can become exceedingly costly for firms to achieve the desired allocation of effort using financial incentives. *Ceteris paribus*, as the difficulty of measuring performance on any one activity increases, economic

theory indicates that the desirability of providing financial incentives decreases, so much so that some have posited that a flat-wage contract may be optimal in multidimensional task situations (Holmstrom & Milgrom, 1991). Theoretically, this occurs for two reasons. First, linking monetary incentives to one dimension of performance but not the other(s) severely attenuates the incentives–effort relation on the unrewarded dimension and, thus, reduces overall task performance. Second, individuals derive *some* utility from work activities and, thus, even in the absence of performance-contingent incentives, will exert non-trivial effort on tasks. Further, since pay is not contingent on performance, employees will allocate their efforts according to the firm's wishes.

This discussion raises an important question regarding the provision of incentives in multidimensional tasks and the extent to which extrinsic incentives can lead to an efficient allocation of effort among an employee's various responsibilities. Along these lines, several prior studies have examined whether incentives tied to one dimension of performance (usually quantity of output) affect another dimension of performance, such as the quality of output or the learning of incidental material. The results of two of these studies (Bahrick, Fitts, & Rankin, 1952; McNamara & Fisch, 1964) show that incentives can have a negative effect on the performance of dimensions that are not rewarded.[28] However, the results of most of these studies indicate that incentives have no effect on the performance of dimensions that are not rewarded (Dornbush, 1965; Hamner & Foster, 1975; Kausler & Trapp, 1962; Riedel et al., 1988; Terborg & Miller, 1978; Wimperis & Farr, 1979), and we are not aware of any empirical studies reporting that incentives have a positive effect on the performance of dimensions that are not rewarded. Further, almost all of these studies do not measure the effect incentives have on effort direction or effort duration regarding the unrewarded dimension of performance. Finally, most of these studies show that incentives do enhance the rewarded dimension of performance (output quantity). These general conclusions are consistent with those of Jenkins et al. (1998), who found that incentives have an average positive effect on performance quantity, but no effect on performance quality, when only performance quantity is rewarded.

The implication of this research for accounting is that it appears to be desirable to link financial incentives to one dimension of performance even if other important dimensions of performance cannot be measured or contracted on. For example, if firms can effectively measure some important dimensions of performance, such as return on investment, but not effectively measure other important dimensions of performance, such as customer satisfaction, then it still seems preferable to at least contract on a limited dimension of performance rather than no dimension at all. In other words, it does not appear that incentives solely tied to one dimension of performance lead to an inefficient reallocation of effort. Thus, it does not appear that incentives should be muted in multidimensional tasks.

Given the prior research that has been conducted in this area, though, these conclusions are tentative and there are a number of directions that future research might take. Most prior research in this area tends to use output quantity and output quality as the two dimensions of performance. However, since subjects typically are rewarded for each unit of *good* output, quantity and quality clearly are linked as any effort expended toward producing output of less than acceptable quality (but higher quantity) will not be rewarded. Thus, subjects receiving incentives have a motivation to maximize output quantity, but only conditioned on each unit passing the quality threshold.

Future research should conduct a much stronger test of the Holmstrom and Milgrom (1991) proposition that incentives can lead to an inappropriate allocation of effort and a reduction in overall performance and firm welfare. In particular, accounting researchers could employ two separate and distinct tasks, whereby subjects need to expli-

[28] Also see Schwartz (1988), who finds that incentives can have negative transfer (carryover) effects when individuals switch tasks. Here, monetary incentives reinforce a "mental set" and a pattern of repetition that is difficult to break when individuals are asked to perform a new task that is substantially different (in terms of the requirements and strategies necessary for good performance) from the previously rewarded task.

citly decide which task to work on and how much effort to devote to each task. Performance-contingent monetary incentives could then be provided on one task but not the other, and this could be compared to subjects' performance under a pure fixed-wage contract. By performing such a study, researchers could clearly measure the effort direction and effort duration expended toward each task as well as the performance on each task. In doing so, though, researchers should be careful to equate the expected payoff between compensation conditions and hold the total time available constant so that appropriate conclusions can be drawn regarding both the effectiveness and the efficiency of each contract.

At a more fundamental level, the multidimensional task contracting problem frequently reduces to motivating employees to innovate and take risks (Holmstrom, 1989). Specifically, managers can be exposed to both compensation risk and human capital risk when the various dimensions of performance are not equally sensitive to their effort (Milgrom & Roberts, 1992). Additionally, even when the dimensions of performance are equally sensitive to effort, managers frequently must select from a menu of projects that vary greatly in both risk and expected return. For example, managers frequently engage in capital budgeting decisions in which they evaluate and select among investments that differ in the timing, magnitude, and riskiness of cash flows. In these situations, the accounting performance measurement and reward system not only needs to motivate high levels of effort from employees, but also needs to encourage the appropriate level of risk taking (i.e. encourage employees to maximize expected performance).

Prior research has not addressed these issues. Specifically, it has not examined which incentive schemes, or combinations and dimensions thereof, induce managers to take appropriate levels of risk (i.e. select projects that maximize expected value) while concurrently motivating high levels of effort. So, for example, do incentives encourage managers to focus on maximizing low variance, low return performance measures (projects) over high variance, high return performance measures (projects)? We currently do not know the answer to this question, and future research directed toward examining this issue would be quite valuable. Moreover, similar sentiments have been echoed by Stephen Ross, who recently commented: "No time has been spent on asking how incentives affect the willingness of the employee to take on risk. More time is going to have to be spent on the reaction to the carrot, not just the stick" (Valance, 2001).

Research directed toward understanding whether and how incentive contracts and their specific properties motivate individuals to focus on certain activities and dimensions of performance (effort direction, strategy development), how hard they work on these activities and dimensions (effort duration, effort intensity), including selecting projects of differing risk and expected return, would be valuable for several reasons. First, such research could facilitate job design and improve our understanding of how decision rights should be partitioned in an organization. This has clear implications for the design of responsibility accounting systems and whether, for example, organizations should seek to change an employee's opportunity costs by limiting the tasks and activities they can work on. Second, such research could facilitate the design and development of performance measures and how precise they need to be to motivate the desired levels of effort, allocation(s) of effort, and risk taking. Finally, such research could be quite informative about the appropriate (relative) compensation weights assigned to each measure of performance (e.g. Banker & Datar, 1989).

3.4.2. Effects of other incentive scheme variables on the incentives–effort–performance relation

Incentive schemes vary on a variety of dimensions. Another dimension that may alter the incentives–effort relation is the level of pay. The issue regarding whether payoff magnitude affects effort and performance is of obvious interest to organizations and researchers. Specifically, for efficiency reasons, organizations would like to minimize the cost associated with eliciting desired levels of effort and performance from their employees (e.g. Merchant, 1998, chapter 11). Analogously, many accounting researchers conducting laboratory experiments would like to

stretch limited research dollars as far as possible yet employ, for motivational purposes, monetary rewards that are salient and dominant (Smith, 1982).

Theoretically, it is unclear how payoff magnitude might affect an individual's effort and performance. First, agency theory (via expected utility theory) suggests that, to elicit any effort from individuals, the expected rewards net of expected effort costs must exceed an individual's reservation wage (Baiman, 1982, 1990). Thus, increasing payoff magnitude could increase performance due to the expected cost-benefit calculation that individuals theoretically execute prior to performing a task. Moreover, as pay increases the expected benefits for good performance increase and costs stay the same (assuming the task is held constant). Therefore, as the tradeoff between costs and benefits tips more toward benefits, people are expected to exert more current effort and/or engage in strategy development (also see Smith & Walker, 1993). However, as mentioned earlier, this increase in effort is dependent upon an individual having a high enough level of self-efficacy (and skill) so that they believe the probability of attaining the accurate performance is high (along with the value of attaining this level of performance). If the expected probability of performing accurately is low, raising the value of good performance likely will not increase effort. Further, the effect on effort of increasing incentives beyond some point depends on the initial point. If the initial level of incentives leads to maximal effort, then increases in payoff magnitude will not increase effort and, thus, have no effect on performance.

Because standard expected utility theory also presumes that most individuals have diminishing marginal utility for wealth, though, increasing rewards may decrease motivation and performance over time since savings increase and further increases in wealth have less value (Lambert, 1983). On the other hand, wealth effects arising from increases in pay likely make individuals more locally risk-neutral and may reduce risk premiums as well as engender decisions that are more consistent with expected value maximization (e.g. Ang & Schwarz, 1985). Finally, work by Akerlof (1982, 1984) suggests that the relation between payoff magnitude and effort and performance is likely to be positive since increasing pay can lead employees and organizations to engage in mutual gift exchange. As compensation increases beyond employees' reservation wages, they are posited to reciprocate by supplying higher levels of effort and performance (c.f. Fehr & Gächter, 2000).

Empirical evidence tends to reflect this theoretical lack of clarity and indicates that increasing the level of payments to subjects has mixed effects on performance (e.g. Camerer & Hogarth, 1999, p. 21; also see Libby, Bloomfield, & Nelson, 2001). Specifically, many studies find that increasing the level of rewards increases performance (e.g. Cabanac, 1986; Hannan, 2001; Pritchard & Curtis, 1973; Smith & Walker, 1993; Toppen, 1965a; Weiner, 1966; Weiner & Walker, 1966). Numerous other studies, however, find that increasing the level of rewards has no effect on performance (e.g. Bonem & Crossman, 1988; Craik & Tulving, 1975; Enzle & Ross, 1978; Farr, Vance, & McIntyre, 1977; Riedel et al., 1988; Toppen, 1965b). Finally, a couple of studies find that increasing the level of rewards results in a decrease in performance (e.g. Pritchard & DeLeo, 1973; Tomporowski, Simpson, & Hager, 1993).

Unfortunately, there is not enough information contained in prior studies that would allow us to disentangle these effects in some meaningful fashion. Moreover, prior research generally does not report on whether varying payoff magnitude affects the underlying effort mechanisms that are theoretically posited to affect task performance.[29] Thus, we know very little about whether increasing or decreasing the level of rewards affects effort direction, effort duration, effort intensity, and strategy development and, if it does, whether this occurs through self-efficacy, goal setting, utility maximization, or other mechanisms.

Given this and the mixed performance findings, it is difficult to assess the implications that prior research on the effects of payoff magnitude has for organizations, accounting researchers, or the design of accounting-based reward systems.

[29] One exception is Enzle and Ross (1978) who find that increasing rewards results in lower task interest.

However, we can highlight several fruitful avenues for future research. Specifically, research needs to be much more systematic and directed in isolating the underlying mechanisms that might produce payoff magnitude effects.

For example, future research might examine the predictive ability of various efficiency wage theories (e.g. Akerlof 1982, 1984; Weiss, 1990; Yellen, 1984) in a setting where the task being performed requires physical and mental effort. Such research could specifically examine the effects that increasing the level of pay has on effort direction, effort duration, effort intensity and strategy development. Additionally, such research could determine whether the observed effects are permanent or more transitory and, thus, whether issues connected with consumption smoothing ultimately arise. Future research also could examine the effects that payoff magnitude has on employees' propensity to take risks and innovate. Specifically, does increasing the level of rewards induce risk-taking behavior because individuals are locally risk-neutral? Or, does increasing rewards engender more risk-averse behavior because individuals feel more performance pressure? Finally, research should pay more careful attention to person variables (skill) and task variables (complexity) that might interact with payoff magnitude as well (e.g. Wright, 1992). In short, such research could prove to be valuable in facilitating cost management and designing an efficient reward system, both for organizations and accounting researchers conducting laboratory experiments.

Monetary incentives also can vary as to the timing of their introduction. Specifically, incentives can be introduced at different stages of processing (prior to or after information search), and timing could vary naturally as the result of different phases of production being under the control of different departments or supervisors. Consistent with the general hypothesis regarding how incentives affect performance, it seems natural that incentives will be more effective when introduced prior to the processing stages in which performance is most sensitive to effort. In support of this, memory studies examining subjects' retention of information (via recall or recognition) have shown that incentives introduced prior to the encoding of information are significantly more effective than equivalent incentives introduced after encoding, but prior to retrieval (Harley, 1968; Libby & Lipe, 1992; Weiner, 1966; Wickens & Simpson, 1968). Such effects occur because incentives given before trace formation or trace storage motivate subjects to exert effort to better organize and rehearse the stimuli, whereas incentives given after trace formation or trace storage are less effective because additional effort at this point can do little to influence retention.

Other timing issues are less clear. For example, how should compensation be structured over an employee's tenure with an organization? Such a question relates to career concerns, the dynamics of contracting, and the provision and structure of incentives over time. While such issues generally have not been examined empirically, they are quite important to organizations and the design of an accounting-based reward system. Thus, should organizations employ a constant payment schedule or an increasing payment schedule? Deferring compensation theoretically is posited to benefit organizational performance by reducing turnover and retaining the most able employees as well as obtaining high levels of effort from an employee throughout their tenure with the firm (e.g. Lazear, 1981; Salop & Salop, 1976). Such payment schedules also may be desirable on equity grounds. Archival research, though, has had difficulty interpreting why firms defer compensation and understanding the benefits that do or do not accrue to such a compensation arrangement (Prendergast, 1999). Experimental research, on the other hand, could provide useful evidence on the structure of payment schedules and their corresponding effects on effort and performance over time. Experimental methods also could help answer other timing questions such as whether the ratio of incentive pay to fixed pay should be constant, increase, or decrease over time. Again, some theory and empirical evidence indicates that the pay-for-performance sensitivity should increase the longer the employee is with the firm (Gibbons & Murphy, 1992), although it is unclear that such an arrangement elicits the optimal effort levels from employees compared to other payment methods.

Other salient dimensions of incentive schemes include whether the incentive contract explicitly embodies competition, whether the incentive scheme incorporates assigned goals, and whether pay should be linked to performance at the individual unit or more aggregate level (e.g. Bonner et al. 2000). In addition to the research opportunities previously discussed, we feel that it is crucial for researchers to examine combinations of incentive schemes. For example, tournament schemes frequently are criticized on the grounds that they induce excessive risk-taking behavior or induce people to "give-up" because they believe that the probability of winning the prize is low (Camerer & Hogarth, 1999; Dye, 1984). On the other hand, piece-rate and budget-based schemes may be best at motivating high levels of effort duration and effort intensity, but may discourage risk-taking and effort directed toward strategy development (and innovation). Prior research, though, has examined incentive schemes in isolation and it is quite possible that, as in the natural environment, the optimal compensation arrangement is one where tournaments are combined with budget-based compensation and a fixed salary. Moreover, such a combination of incentive schemes may best balance short-term effort duration and intensity with longer-term effort directed toward strategy development as well as motivating choices consistent with expected value maximization.

In summary, there are numerous dimensions of incentive schemes per se that may affect task performance. Similar to person, task, and environmental variables, prior research provides some guidance regarding how to best relate pay to performance. That said, more research clearly is needed to understand whether and how the explicit and implicit features of incentive contracts elicit the desired levels and types of effort and, thus, align the interests of employees with those of the organization. At a fundamental level, such research is important to accounting because it relates to the dimensions of performance that are measured, when and how they are measured, and how such measures are ultimately used in evaluating and rewarding employees. Such research also relates to cost management and, therefore, can help facilitate the design of the most effective and efficient accounting-based performance measurement and reward system.

4. Conclusions

In this paper, we present theories, evidence, and a framework for understanding the effects of monetary incentives on effort and task performance. We first describe the fundamental incentives–effort and effort–performance relations and the four dimensions of effort that monetary incentives theoretically are posited to affect: direction, duration, intensity, and strategy development. We then discuss psychological and economic theories that explicate the incentives-effort link. Here, we detail many of the underlying cognitive and motivational process mechanisms by which monetary incentives are presumed to lead to increases in effort and, thus, increases in performance.

We also provide a conceptual framework for the effects of monetary incentives on effort and task performance. This framework facilitates a comprehensive consideration of the variables that may combine with monetary incentives in affecting performance. Specifically, we formulate the incentives–effort and effort–performance relations as a function of person variables, task variables, environmental variables, and incentive scheme variables. We then use our conceptual framework to organize and integrate a large amount of evidence on the efficacy of monetary incentives. In this regard, the framework is employed to focus on how salient features of accounting settings may moderate the positive effects of monetary incentives and, thus, to understand the effects of monetary incentives in numerous contexts of interest to accounting researchers.

We then choose one specific variable from each of the person, task, environmental, and incentive scheme categories within the framework and discuss its relation with monetary incentives. The four particular variables we examine in-depth are: skill, task complexity, assigned goals, and the rewarded dimension of performance. For each of these variables, we discuss its importance in accounting settings as well as the theoretical and practical importance of examining the variable in

conjunction with monetary incentives. We then present theoretical predictions and review the empirical evidence regarding the combination of these accounting-related variables and monetary incentives on individual effort and performance. We pay particular attention to the significant implications that our integration and compilation of theories and evidence has for accounting research and practice. Following this, we highlight numerous directions for future research in accounting that could provide important insights into the efficacy of monetary reward systems. Finally, while we restrict our primary attention to four specific variables we also briefly discuss theories, empirical evidence, and directions for future research for several other person, task, environmental, and incentive scheme variables that are important in accounting settings.

Our framework and review of the attendant evidence indicates that there are a number of accounting-related variables that can alter the effects of incentives on performance. For example, we find that, on average, explicit performance targets (assigned goals) have additive positive effects on effort and performance over monetary incentives, thereby suggesting that organizations should employ performance targets in conjunction with monetary incentives to motivate employees. However, we also find evidence of an interaction between the difficulty of the goal and the type of incentive scheme. Specifically, compared to piece-rate schemes, performance typically is better under budget-based (quota) schemes when goals are moderate, but worse when goals are difficult. This evidence has implications regarding whether assigned goals and incentives should be kept as separate motivating mechanisms or whether incentives should be linked to goal attainment.

We also find that features of accounting settings can attenuate the positive effects of monetary incentives on performance by altering either the effect of incentives on effort or altering the effect of incentives-induced effort on performance. For example, we find evidence that lack of skill can attenuate the effort–performance relation because, while monetary incentives may induce higher levels of effort, the performance of individuals who lack requisite skills is not sensitive to these effort increases. Additionally, lack of skill can attenuate the incentives–effort relation. Specifically, when individuals are assigned tasks for which they do not have the necessary skills, they may not increase their effort under monetary incentives because they believe that effort increases will not lead to performance increases and consequent rewards. Alternatively, when individuals are allowed to select their own contracts for a particular task, individuals with high skill are more likely to choose contingent pay, thereby restoring a positive incentives–effort relation.

Because we delve deeply into the underlying cognitive and motivational processes, we explore the multiple roles that a particular variable, such as skill, can play in affecting the incentives–performance relation. These multiple roles are not inconsequential. For example, recognizing that task complexity itself can affect self-efficacy and, in turn, whether and how incentives affect the various dimensions of effort, highlights the critical role that task characteristics may play in determining short-run and long-run performance under monetary incentives. Moreover, understanding the processes by which accounting-related variables alter the incentives–performance relation and which part of the relation they alter can be critical for suggesting solutions that might restore a positive effect of incentives on performance. For instance, understanding how incentive contracts and their dimensions (e.g. which dimension(s) of performance they reward) affect employees' allocations and levels of effort has possible, and perhaps distinct, implications for the structure of monetary reward systems, how performance is measured, the development of responsibility accounting systems, and job design.

Our paper also makes clear that there are many important research questions that need to be addressed in accounting—and other disciplines—before it is appropriate to make strong recommendations to organizations and experimenters regarding the use and form of monetary incentives. In this vein, for each category within our framework, we develop and discuss several directions for future research that we feel would help fill gaps in our knowledge regarding the effectiveness of monetary reward systems. Moreover, we

identify opportunities for future accounting research that reports on how salient accounting-related person, task, environmental, and incentive scheme variables combine with monetary incentives to affect individual effort and performance. We feel such future research is vital given the important role that accountants and accounting information play in compensation practice and the design of performance-measurement and reward systems. In this way, organizations and researchers will have better information regarding the circumstances under which monetary incentives yield desired levels and types of effort and performance in either the field or the laboratory.

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