

**Do Balanced Scorecard Incentive Contract Type and
Business Life-Cycle Affect Managerial Effort and Performance?**

Hung-Chao Yu*
Department of Accounting
National Chengchi University
Taipei, TAIWAN, ROC
(2) 2939-3091 ext. 81010
hju@nccu.edu.tw

Ella Mae Matsumura
Department of Accounting & Information Systems
University of Wisconsin – Madison
Madison, WI 53706, U.S.A.
(608) 262-9731
ematsumura@bus.wisc.edu

Sandra C. Vera-Muñoz
248 Mendoza College of Business
University of Notre Dame
Notre Dame, IN 46556-5646
(574) 631-9041
sveramun@nd.edu

November 1, 2006

*Corresponding author

We thank Chin-Fu Chang, Wen-Ying Wang, Alan Webb, Anne Wu, two anonymous reviewers for the 2007 Management Accounting Research Conference, workshop participants at the National Chengchi University, and workshop participants at the 2006 AAA Annual Meeting for their valuable suggestions. We are grateful to Rajiv Banker, Hsihui Chang, and Mina Pizzini for allowing us to use their experimental instruments, and to Hsien-Liang Chiu for his able assistance with programming and data collection. The first author gratefully acknowledges financial support from the National Science Council (Project No. NSC 92-2416-H-004-032), and the third author acknowledges financial support by KPMG through its Faculty Fellowship program.

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ABSTRACT

The importance of linking Balanced Scorecard performance measures to the firm's strategy is well documented. Yet, very few accounting studies have addressed whether business life-cycle and the strength of the association between achievement of Balanced Scorecard (BSC) performance targets and compensation affect managers' effort and performance. We address this issue with a laboratory experiment that manipulates the BSC incentive contract type and the strategic business unit's (SBU) life-cycle stage. We find that incentive contract type and the SBU's life-cycle individually affect managers' effort and performance. Specifically, incentive contracts that directly link managerial compensation to the achievement of BSC performance targets induce managers to choose higher effort levels, and to achieve higher performance, relative to incentive contracts in which managerial bonuses are either subjectively determined, or are not directly linked to the achievement of BSC performance targets. Importantly, the effect of life-cycle on managers' effort level choices is stronger when the incentive contracts directly link managerial compensation to the achievement of the BSC performance targets. Further, our results of causal path analyses indicate that managers' perceptions of whether their bonuses are appropriately linked to the BSC performance measures play a mediating role between incentive contract type and managers' effort level choices and performance. Finally, we find that SBU's life-cycle and incentive contract type jointly affect managers' overall performance, even though they do not jointly affect their effort. We discuss implications of our findings and provide some directions for future research.

JEL classification: D82, J33, L22, M41

Key words: Balanced Scorecard; incentive contract; life-cycle; effort and performance; distributive and procedural justice; laboratory experiment; causal path-analyses

Data Availability: The experimental data are available from the authors upon request.

I. INTRODUCTION

The Balanced Scorecard (BSC) links the firm's strategy to its processes, activities, and operational performance measures (Kaplan and Norton 1992), and has been widely adopted by both large and small firms over the last decade (Frigo and Krumwiede 2000; Silk 1998; Kaplan and Norton 1996a, 1996b). Prior research documents the importance of linking BSC performance measures to the firm's strategic objectives (e.g., Banker et al, 2000, 2001a; Ittner and Larcker 1998a, 1998b). Yet, with a few notable exceptions (e.g., Dilla and Steinbart 2005; Roberts et al. 2004; Ittner et al. 2003), prior studies have not examined the association between managerial compensation based on BSC measures and managers' effort and performance, even though there is some evidence that firms are struggling with this issue (Ittner et al. 2003). Thus, our first research question is: Do managers' effort and performance increase with increases in the strength of the association between managerial compensation and the achievement of BSC performance targets?

Linking incentive contracts to BSC measures helps to better align managers' day-to-day activities with their companies' long-term strategic objectives and value-maximization goals (Bryant et al. 2004; Kaplan and Norton 2001, 253; Manas 1999). This is because these incentive contracts draw managers' attention to the measures that are most critical to achieving the firm's strategy (Kaplan and Norton 2006, 266). Further, a 1998 survey study by the Hay Group indicates that most of the leading-edge users of the BSC in their study designed their incentive contracts to encourage and reward managers' pursuit and achievement of the BSC's expanded scope of measurement (Kaplan and Norton 2001). This is consistent with the view that incorporating BSC performance measures in managers' incentive contracts helps firms to better communicate how managerial rewards are linked to desired strategic outcomes (Niven 2002;

Kaplan and Norton 2001; Frigo and Krumwiede 2000; Otley 1999).

Prior research shows that the level of difficulty in achieving performance targets affects the relative level of attention and effort that managers pay to the measures (Otley 1999). This suggests that managers of growth-stage SBUs competing in tough growth markets may be more likely to exert higher effort to achieve BSC performance targets, relative to managers of stable, mature-stage “cash-cow” SBUs (Reibstein 1987). This is because, in general, mature-stage SBUs enjoy long-term cost and demand advantages over competitors, while growth-stage SBUs seek to develop such advantages, often with strategies that are also likely to lower short-term profitability (Jenkins et al. 2004, 8). Thus, our second research question is: Does the SBU’s life-cycle stage affect managers’ effort and performance?

Prior research shows that SBU managers are more satisfied with the BSC when the achievement of its various performance targets is linked to their compensation and rewards (Kaplan and Norton 2001; Malina and Selto 2001). This is consistent with psychology research that suggests that individuals’ perceptions of how their performance is measured and compensated affect their effort (McFarlin and Sweeney 1992; Moorman 1991). Accordingly, if SBU managers do not perceive a direct link between BSC measures and their compensation, then they may focus exclusively on measures that directly affect their compensation, thus leading to a potential failure of the BSC implementation (Niven 2002). Thus, our third research question is: Do SBU managers’ perceptions of whether their compensation is appropriately linked to the BSC performance measures play a mediating role between incentive contract type and managers’ effort and performance?

We address our three research questions using a laboratory experiment with two variables manipulated between subjects: the strength of the association between achievement of BSC

performance targets and managerial compensation (proxied by the type of incentive contract, discussed below), and the SBU's life-cycle stage (mature vs. growth). We use five incentive contract types to systematically vary the strength of the association between achievement of the BSC performance targets and managerial compensation (Bonner et al. 2000, 26).¹ Specifically, in the performance-weighted (PW) contract, the bonus is determined by the sum of the manager's performance score in each BSC measure, multiplied by a weight that has been pre-assigned to each measure. In the performance threshold (T) contract, the bonus is determined by the sum of the pre-assigned weights only for the BSC measures that meet or exceed the targets. The performance-rating (PR) contract is similar to the PW contract, except that the bonus rates are divided into five categories based on the manager's overall performance score (discussed in the method section). In the subjective (S) contract, the bonus rate is subjectively determined using an algorithm found in Ittner et al.'s (2003) case study. Finally, as a benchmark for comparison, we use a simple-linear (SL) contract whereby SBU managers are compensated with a fixed bonus rate regardless of their performance on the BSC measures.

We find that incentive contract type and SBU life-cycle stage individually affect managers' *effort*. In particular, incentive contracts that directly link managerial bonuses to the achievement of the BSC performance targets induce SBU managers to choose higher effort levels to meet or exceed the targets, relative to incentive contracts that either do not link bonuses directly to the achievement of BSC performance targets (i.e., the SL contract), or that determine the bonuses subjectively (i.e., the S contract). Also, we find that, across BSC incentive contracts, managers of the growth-stage SBU choose significantly higher effort levels than managers of the

¹ Bonner et al. (2000, 26) posit that "financial incentive" refers to an extrinsic motivator in which pay is linked to performance (i.e., financial incentives implies the presence of a link between pay and performance). This definition is consistent with the use of the term by others in the literature (e.g., Hilton et al. 2006, 835; Prendergast 1999; Jenkins et al. 1998; Atkinson et al. 2004, 330).

mature-stage SBU.

Furthermore, we find that managers' perceptions of whether their bonuses are appropriately linked to the BSC performance measures play a mediating role between incentive contract type and managers' effort level choices and performance. Specifically, results of path analyses show that incentive contract type significantly affects managers' perceptions of the link between their bonuses and achievement of the BSC performance targets. In turn, managers' perceptions significantly affect their effort level choices, which in turn affect their overall performance.

Importantly, our results from supplementary analyses indicate that, across the four BSC perspectives, SBU life-cycle and incentive contract type jointly affect managers' overall performance, even though they do not jointly affect their effort. Further analyses of this interaction reveal that life-cycle affects managers' effort level choices, but only when the incentive contracts directly link managerial compensation to the achievement of the BSC performance targets. To our knowledge, this is the first study to document the individual and joint effects of incentive contract type and SBU life-cycle stage on managers' effort and performance. Our findings suggest that when designing incentive contracts that incorporate BSC performance measures, the extent to which the strength of the link between achievement of BSC performance targets and managerial compensation affects managers' effort and performance is not independent of the SBU's life-cycle stage.

We organize the remainder of this paper as follows. In Section II we use accounting and psychology research to motivate our hypotheses. Sections III and IV describe our experimental design and results, respectively. Section V concludes, discusses implications, and provides some directions for future research.

II. HYPOTHESES DEVELOPMENT

Incentive Contracts

The design of incentive contracts constitutes the cornerstone of the theory of the firm (Baker et al. 1988). Not surprisingly, then, over the last two decades, several managerial accounting studies have examined the role of performance measures in incentive contracts' design (e.g., Murphy 2001; Yim 2001; Sprinkle 2000; Feltham and Xie 1994), and the role of incentive contracts in motivating agents' efforts (e.g., Dutta 2003; Murphy 1999; Banker et al. 1998).² While there is robust empirical evidence that incentive contracts affect agents' behavior (Prendergast 1999; Wallace 1997; Banker et al. 1996; Healy 1985; Larcker 1983), with a few notable exceptions (e.g., Dilla and Steinbart 2005; Roberts et al. 2004; Ittner et al. 2003), prior studies have not examined the association between managerial compensation based on BSC measures and managers' effort and performance, even though there is some evidence that firms are struggling with this issue (Ittner et al. 2003).

Recent studies and surveys indicate that the link between BSC performance measures and compensation draws employees' attention to the measures that are most critical for achieving the firm's strategy. Although the BSC was introduced in the early 1990's, research on this link has only recently emerged. For example, Malina and Selto (2001) find that SBU managers are more satisfied with the BSC when its performance measures are linked to rewards. In particular, when SBU managers perceive that their rewards are linked to the achievement of BSC performance measures, the BSC provides incentives for managers to align their actions with the firm's strategic objectives. In a case study with a global financial services firm, Ittner et al. (2003) examine how different performance measures are weighted in a subjective BSC bonus plan. The

² See, for example, Gibbons (1998), Lambert (2001), Murphy (1999) and Prendergast (1999) for literature reviews on incentive contracts.

plan hindered the BSC implementation because it induced supervisors to exhibit favoritism, thus imposing high uncertainty upon the subordinates. The firm subsequently gave up on their BSC and instead adopted a standard incentive contract with a formula-based bonus plan.

The above discussion suggests that the effects of the link between the achievement of BSC performance measures and managerial compensation on managers' effort and performance are still unclear and thus, warrant more research. In this study, we examine five different types of BSC incentive contracts that differ on the strength of the aforementioned link. These contracts are all of the form $a + b \times (\text{bonus pool})$, where a is the SBU manager's fixed salary, b is the bonus rate, $\text{bonus pool} = \varphi \times (\text{Income Realization})$, and φ is the percentage of the income realization (IR) available for a potential bonus payment to each SBU manager at the end of each period. We choose this contract form because it is common in practice and has been extensively examined in the agency and information economics literatures (e.g., Bonner et al. 2000; Sprinkle 2000; Chow et al. 1995; Darrough and Stoughton 1988; Holmstrom 1979, 1982; Demski and Feltham 1978). As discussed below and in Table 1, the contracts differ in how they link managerial compensation to the achievement of BSC performance measures.

[Insert Table 1 here]

Performance-weighted (PW). This contract takes into account an SBU manager's performance on all of the BSC measures (discussed in the next section) by setting the bonus rate b equal to the manager's overall performance score (OPS), which is a weighted-average of all the BSC measures. Because $b = \text{OPS}$, the association between the achievement of all the BSC performance targets and the manager's compensation is the strongest of our five contracts.

Performance-rating (PR). This contract differs from the PW contract in that the bonus rate b increases discontinuously in a manager's OPS. This is because the bonus rates are determined

based on five predetermined ranges of OPS. Since the mapping between managers' OPS and b is discontinuous, the association between the achievement of BSC performance targets and the compensation is relatively weaker than in the PW contract. Thus, we expect that managers will choose relatively lower effort under the PR contract than under the PW contract. Let E denote a manager's effort level choice and let the subscript denote the incentive contract type. Based on the above discussion, we posit the following effort relation across the four BSC perspectives:

$$E_{PW} > E_{PR}. \quad (1)$$

Threshold (T). This contract compensates SBU managers based only on their performance on those BSC measures that meet or exceed the targets. The bonus rate is the sum of the pre-assigned weights for those BSC measures for which the actual realizations meet or exceed the targets. In this contract, the association between the achievement of BSC performance targets and the compensation is weaker than in the PW and PR contracts because: (1) the T contract does not take into account the amount by which the manager exceeds a target; and (2) it ignores managers' performance on those measures that are below the targets. Due to the contract's exclusive emphasis on BSC measures that meet or exceed the targets, we expect that, as compared with the PW and PR contracts, the T contract will induce managers to choose relatively higher effort levels for BSC measures that have higher weights than for BSC measures that have lower weights.

In our setting, we assign combined weights of 40 percent and 25 percent to the financial and internal process perspectives, respectively, and 20 percent and 15 percent to the customer and learning and growth perspectives, respectively. Therefore, we posit the following effort relations for each pair of the BSC perspectives:

$$\text{Financial (40\%) and internal process (25\%): } E_T > E_{PW} > E_{PR}. \quad (2-1)$$

$$\text{Customer (20\%) and learning and growth (15\%): } E_{PW} > E_{PR} > E_T. \quad (2-2)$$

Subjective compensation (S). In this contract, the bonus rate b is subjectively determined following the algorithm documented in Ittner et al. (2003). Because this contract ignores some of the BSC performance measures and the weights assigned to each measure will change from time to time, the association between the achievement of BSC performance targets and the compensation is weaker than in the PW, PR, and T contracts. Thus, we posit that managers' effort level choices under the S contract will be lower than those under the T, PR, and PW contracts. In other words, we propose:

$$E_T > E_S, E_{PR} > E_S, \text{ and } E_{PW} > E_S. \quad (3)$$

Simple-linear (SL). This contract compensates managers with a fixed bonus rate $b = 0.733$ regardless of managers' performance on any of the four BSC perspectives. Since there is no association between the achievement of BSC performance targets and managerial compensation, we expect that this contract will provide little or no incentives for SBU managers to choose high effort. Therefore, we predict that the SL contract will induce the lowest effort across the four BSC perspectives. As such, the SL contract provides a benchmark for comparison with the preceding four contract types (Davis and Holt 1993; Smith 1976). We propose the following effort relations for each pair of the BSC perspectives:

$$\text{Financial (40\%) and internal process (25\%): } E_T > E_{PW} > E_{PR} > E_{SL}. \quad (4-1)$$

$$\text{Customer (20\%) and learning and growth (15\%): } E_{PW} > E_{PR} > E_T > E_{SL}. \quad (4-2)$$

Notice that to compare managers' effort between the SL and S contracts it is important to look beyond the contracts' properties alone. On one hand, the S contract may lead managers to try to achieve a higher bonus rate b . If so, then managers' effort may be higher in the S contract

than in the SL contract. On the other hand, owing to the uncertainty in the determination of b under the S contract, managers instead may try to minimize their disutility for effort in the face of high uncertainty. In this case, managers' effort under the S contract may not differ from managers' effort under the SL contract. Thus, we posit two competing predictions:

$$E_S > E_{SL} \text{ or } E_S = E_{SL}. \quad (5)$$

Combining inequalities (1), (2-1), (2-2), (3), (4-1), (4-2), and (5) leads to the following between-contract comparison hypothesis:

H1: For each BSC perspective, managers' effort will increase with increases in the strength of the association between the achievement of BSC performance targets and managerial compensation:

(1) Financial (40% weight): $E_T > E_{PW} > E_{PR} > E_S > (\text{or } =) E_{SL}$.

(2) Internal process (25% weight): $E_T > E_{PW} > E_{PR} > E_S > (\text{or } =) E_{SL}$.

(3) Customer (20% weight): $E_{PW} > E_{PR} > E_T > E_S > (\text{or } =) E_{SL}$.

(4) Learning and growth (15% weight): $E_{PW} > E_{PR} > E_T > E_S > (\text{or } =) E_{SL}$.

Strategic Business Unit's Life-Cycle

Strategic business units are distinguished by their product or service life-cycle into introductory, growth, maturity, and decline stages (Buzzell et al. 1987).³ To be successful in each of their product or service life-cycle stages, SBU managers deploy different strategies designed to maximize the productive use of scarce resources available at each stage (Hamermesh 1986). In the introductory-stage, SBUs introduce a product or service to the market with heavy advertising and promotion to try to stimulate demand. In the growth stage, sales take off, market share increases, and the cash flow improves. In the maturity stage, sales stabilize and SBU managers

³ A business unit is a division, product line, or other profit center within its parent company, which sells a distinct set of products or services to an identifiable group of customers, and competes with a well-defined set of competitors (Buzzell et al. 1975).

employ a creative defensive strategy to maintain its share of the market. This stage is profitable due to its positive cash flow, and managers have every incentive to prolong the maturity stage to continue generating cash or cutting costs. The decline stage is characterized by declining sales, tight cash flows, reduced marketing expenditures, and threat of product or service divestiture (Fredenberger and Bonnici 1994, 60).⁴

Prior research shows that the level of difficulty in achieving performance targets affects the relative levels of attention and effort that managers pay to the measures (Otley 1999). This suggests that managers may tend to exert higher effort in achieving performance targets for growth-stage SBUs competing in tough growth markets, relative to managers in stable, mature-stage “cash-cow” SBUs (Reibstein 1987). This is because mature-stage SBUs enjoy long-term cost and demand advantages over competitors (e.g., first-mover advantages, entrenched access to distribution channels, scale economies). In turn, these advantages yield relatively greater benefits in terms of operational efficiency and overall corporate profitability.

In contrast, growth-stage SBUs have to develop such advantages first with strategies that are likely to lower short-term profitability. For instance, expenditures for research and development, the building of brand name, marketing and advertising, the establishment of proprietary distribution, and so forth, are intended to increase profitability in the long run, but are also likely to lower profit margins in the short-term (Jenkins et al. 2004, 8). Thus, we propose the following hypotheses on the individual effect of SBU life-cycle stage on managers’ effort and performance:

H2(a): Across the four BSC perspectives, managers’ effort for growth-stage SBUs will be higher than managers’ effort for mature-stage SBUs.

⁴ While life-cycle theory supports emphasis on different strategies for different life-cycle stages, from a practical perspective SBUs cannot abandon, in any stage, all regard for growth or profitability in favor of the other. This is because the two strategies are not mutually exclusive, and they both rely on analyses of market trends, industry conditions, technological changes, competition, and the SBUs’ strengths and weaknesses.

H2(b): The overall performance of managers of growth-stage SBUs will be higher than the overall performance of managers of mature-stage SBUs.

Managers' Perceptions of the Pay-BSC Performance Measure Link

Managerial psychology research provides evidence that the perception of justice is one of the values to which employees are the most sensitive. Research into justice in the workplace has emphasized organizational justice, which includes two dimensions, distributive and procedural (Cole and Flint 2004; Hauenstein et al. 2002; Tremblay et al. 2000; McFarlin and Sweeney 1992; Moorman 1991). Distributive justice refers to the perceived fairness of the amount and form of compensation or allocation an employee receives (Milkovich and Newman 2005). Procedural justice examines the reactions of individuals to the methods, mechanisms, and processes used to determine compensation (Brockner et al. 2000; Folger and Cropanzano 1998). That is, distributive justice focuses on ends, while procedural justice focuses on means (Sweeney and McFarlin 1993).

An individual's perception of organizational justice is important because research shows that it affects a number of behaviors and attitudes, including organizational commitment (Ball et al. 1994; McFarlin and Sweeney 1992; Konovsky et al. 1987) and pay satisfaction (Sheppard et al. 1992; Miceli and Lane 1991; Folger and Konovsky 1989; Konovsky et al. 1987). A highly committed individual is one who has a willingness to exert considerable effort on behalf of the organization, and who has a strong belief in and acceptance of the organization's goals and values (Samad 2006).

An important determinant of the success of the BSC implementation is that managers perceive that their compensation and bonuses appropriately reflect their achievements of the BSC performance targets (Nevin 2002; Kaplan and Norton 2001). Taken together, findings from

organizational justice studies suggest that individuals' perceptions of the link between pay and performance (i.e., how pay is tied to performance) will affect their effort. Thus, SBU managers who perceive that the BSC performance measures are not appropriately linked to their compensation may focus only on achieving non-BSC performance targets that directly affect their bonus awards, thus leading to a potential failure of the BSC implementation (Niven 2002).

Accordingly, we propose the following hypotheses:

- H3(a):** Managers' perceptions of whether the BSC performance measures are appropriately linked to their compensation will be affected by the incentive contract type.
- H3(b):** Managers' effort will be affected by their perceptions of whether the BSC performance measures are appropriately linked to their compensation.
- H3(c):** Managers' performance will be affected by their effort.

We also examine the interaction between incentive contract type and life-cycle stage on managers' effort and performance. Recall that three out of the five incentive contracts (performance-weighted, performance-rating, and threshold) have a stronger link between managerial compensation and the achievement of BSC performance targets, relative to the other two contracts (subjective and simple-linear). Thus, we conjecture that the effect of SBU's life-cycle on managers' effort and performance will depend on the incentive contract type. Because these interaction effects are exploratory, we do not formally state them in hypothesis form.

III. METHOD

Overview

We conducted a computer-based experiment with five experimental sessions (one for each incentive contract type) to examine the effects of the strength of the association between managerial compensation and BSC performance measures (proxied by the incentive contract

type) and the SBU's life-cycle stage on managers' effort and performance. We also examine whether SBU managers' perceptions of the pay-BSC performance measure link affect their effort and performance. We manipulate two variables between subjects: incentive contract type (discussed below) and the SBU's life-cycle stage (mature vs. growth). We use a fictitious currency called Experimental Dollars (EDs). Each experiment consists of 40 periods to allow participants to fully discern their best decisions through learning (Cox and Isaac 1986).

Participants

A total of 100 second-year MBA students completed the experiment in a computer lab at a major business school. We assigned twenty participants randomly to each of the five experimental sessions, with ten participants playing the role of the growth-stage store manager and ten playing the role of the mature-stage store manager. All the participants reported having a bachelors degree with a major in accounting, 48 percent are male, and their average age is 24.78 years.⁵

Experimental Materials and Task

This study borrows from the experimental materials used in Banker et al. (2004), who in turn replicate much of the structure of Lipe and Salterio (2000). The case materials describe Smithson Stores, a clothing retailer that had recently implemented a BSC performance measurement system. The case focuses on the performance of two SBUs of Smithson's stores, the Women's Store (WS) and the Family Store (FS), each with a different strategy and target market. The case provides a narrative overview of the company, including its mission statement and a brief description of each SBU. The WS is described as a retailer of fashionable women's

⁵ Our participants had learned the fundamental BSC concepts in their senior year and had taken an advanced managerial accounting seminar in their first year in the MBA program. The materials for this course include Kaplan and Norton's (1992, 1996a) articles, selected topics in Kaplan and Norton's (1996b, 2001, 2004) books, and a BSC case study. Thus, our participants possessed the requisite BSC-related knowledge for the experiment (Libby and Tan 1994; Bonner 1990; Bonner and Lewis 1990).

clothing in the mature stage of the business life-cycle. The FS is described as a retailer of clothing for young families, and is in the growth stage of the business life-cycle. The case materials also include, for each SBU, eight performance measures with their definitions, and actual versus targeted performance. Appendix 1 shows the case materials.

Two features of our experimental design differ from those of Banker et al. (2004). First, Banker et al. examine whether superiors' evaluations of the performance of SBU managers depend on strategically linked BSC performance measures of the BSC. Thus, they use four performance measures for each of the four BSC perspectives, resulting in 16 measures for each SBU. Within each perspective, two measures are common to both SBUs and two measures are unique to each SBU (Lipe and Salterio 2000). They also distinguished between measures that are linked to SBU strategy and those that are not. As mentioned earlier, our study examines the individual and joint effects of incentive contract type and SBU's life-cycle stage on managers' effort and performance. Thus, for each of the four BSC perspectives, we use only the common and unique performance measures that are linked to the SBU's strategy. This results in eight BSC measures (instead of Banker et al.'s 16 measures) and is consistent with research in cognitive psychology that shows that people are generally unable to process more than 7~9 items of information simultaneously (Baddeley 1994; Miller 1956). Second, participants in Banker et al. (2004) assumed the role of supervisors and were asked to evaluate the overall performance of two SBU managers. In our study, participants assume the role of SBU managers who are asked to choose their effort levels.

Prior to the experiment the participants completed a one-hour computer-based training where they received written instructions that were read aloud by one of the experimenters. The participants were encouraged to ask any clarifying questions, and then completed a quiz

(consisting of seven true/false and two calculation questions) to ensure that they understood the instructions and how their decisions would affect their cash payments.⁶ The participants received \$0.10 for each true/false question answered correctly, and \$0.15 for each calculation question answered correctly. The amount paid to the participants ranged from \$0.95 to \$1.00, with an average of \$0.98. Immediately following the training session the participants began the one-hour experimental session.

Figure 1 shows the sequence of actions in the experiment. The participants assume the role of a retail store manager of either the WS or the FS. The principal announces the incentive contract offered to the manager, selects the BSC performance measures, and sets the targets. The manager then selects an effort level (out of five different choices) for each of the four BSC perspectives. As shown in Appendix 2, each effort level maps to an effort cost and to a range of possible realized performance measures with a uniform distribution. Participants can trade-off their effort levels among the four BSC perspectives. After the participants choose the effort levels for each of the four BSC perspectives, the computer determines the realized performance measures from a uniform distribution over the pre-specified range corresponding to the effort level,⁷ and calculates the overall performance score (OPS, discussed below) and bonus rate b for each SBU manager according to a specific BSC contract (discussed below). The experimental period then ends.

[Insert Figure 1 here]

Participants then completed a post-experimental questionnaire, received their earnings

⁶ Prior to the experiment, we conducted a pilot test using 20 senior accounting-major students to assess the clarity and completeness of the experimental materials and instructions, and to ensure that the computer program worked well.

⁷ The pre-specified ranges capture differences between the mature and growth SBUs. An important feature of the experiment is that the probability that a range will meet or beat the targets increases as the effort level increases. That is, the pre-specified ranges shift to higher values as effort increases.

privately in cash, and were dismissed. We used the post-experimental questionnaire to gather background information, to gain an understanding of whether participants perceived that they were adequately compensated, and to understand how the participants made their decisions.

Independent Variables

Type of Incentive Contract

Based on the BSC literature, we use five different types of incentive contracts of the form $a + b \times (\text{bonus pool})$, where a is the SBU manager's fixed salary, b is the bonus rate, bonus pool = $\varphi \times (\text{Income Realization})$, and φ is the percentage of the income realization (IR) available for a potential bonus payment to each SBU manager at the end of each period. Table 1 summarizes key details of the incentive contracts, including determination of b for each contract type. We next explain how OPS is computed, and then provide details of each incentive contract type.

As shown in Appendix 3, an SBU manager's OPS is evaluated and computed in four steps: (1) use four color ratings to denote four different performance levels: GREEN for outstanding ("exceeds targets"); YELLOW for very good ("meets or exceeds targets"); WHITE for satisfactory ("close to targets"); and RED for poor ("fails to meet targets"); (2) establish the quantitative thresholds for each color rating. We chose 75 percent of the target as the minimum level of performance for granting a bonus because the 1998 Hay Group study finds that bonus payouts typically start when performance reaches 75 percent of the targets (Kaplan and Norton 2001, 254); (3) assign a performance score to each color rating. For example, we assign a performance score of one to GREEN because the realized number exceeds 110 percent of the target. In contrast, RED denotes the case where the realized number of a given BSC performance measure is below 75 percent of the target; thus, in this case we assign a performance score of zero; (4) to obtain each manager's OPS, multiply the performance score of each BSC measure by

its corresponding pre-specified weight. This BSC performance measurement scheme has two advantages: (a) it is easy for managers to understand (Malina and Selto 2001); and (b) managers can “strategize” their performance-based bonuses by choosing higher effort levels for some measures and lower effort levels for other measures (Niven 2002).

We use five different incentive contracts, discussed below in descending order of the strength of the link between achievement of the BSC performance targets and managerial compensation:

(1) Performance-weighted (PW). Appendix 4 provides a detailed example of this contract. Out of the five contracts, this contract, adapted from Malina and Selto (2001), has the strongest association between the achievement of the BSC performance measures and managerial compensation. This is because the contract sets $b = OPS$, the weighted-average of all the BSC performance measures. Thus, the contract rewards SBU managers based on their performance on all of the BSC performance measures.

(2) Performance rating (PR). Appendix 5 provides a detailed example of this contract. We adapt this contract from the Winterthur International case discussed in Kaplan and Norton (2001, 261-262). This contract differs from the PW contract in that the bonus rate b increases discontinuously in a manager’s OPS. This is because the bonus rates are determined based on five predetermined ranges of OPS. Due to this discontinuity property, a manager whose OPS is 0.695, for example, will earn a bonus rate of $b = 0.695$ under the PW contract (as illustrated in Appendix 4), but will only earn a bonus rate of $b = 0.5$ under the PR contract (as illustrated in Appendix 5). Since the mapping between managers’ OPS and b is discontinuous, the link between the achievement of BSC performance targets and managerial compensation is weaker than in the PW contract.

(3) Threshold (T). Appendix 6 provides a detailed example of this contract. Under this contract, adapted from Niven (2002, 248-249), the SBU manager earns bonus rate b solely based on BSC measures that meet or exceed the targets. Recall that we assign weights of 40 percent and 25 percent to the financial and internal process perspectives, respectively, and 20 percent and 15 percent to the customer and learning and growth perspectives, respectively. Thus, the T contract may induce managers to over-invest (under-invest) effort on the BSC measures that have higher (lower) weights, and thus, may lead them to make decisions that are not consistent with the company's strategies.

(4) Subjective (S) compensation. Appendix 7 provides a detailed example of this contract. In this contract the bonus rate b is subjectively determined following the algorithm documented in Ittner et al. (2003). Because this contract ignores some of the BSC performance measures and the weights assigned to each measure will change from time to time, the association between the achievement of BSC performance targets and the compensation is weaker than in the PW, PR, and T contracts.

(5) Simple linear (SL). This contract compensates SBU managers using a fixed bonus rate $b = 0.733$, regardless of managers' performance on any of the four BSC perspectives (see panels A and B of Appendix 8). Thus, there is no association between the achievement of BSC performance targets and managerial compensation. The SL contract provides a benchmark for comparisons with the preceding four contract types. Panel C of Appendix 8 provides a summary comparison of managers' bonus rate b for the five incentive contracts.

In the experiment, we set $a = 120,000$ EDs, $\varphi = 0.15$, and $IR = 1,500,000$ EDs. We do not define IR to be a function of the manager's OPS. Specifically, in our experiment there is not a one-to-one *monotonic* relationship between managers' effort level choices and their performance.

This is because the realized performance measures are probabilistically determined by managers' effort level choices. Further, the realized performance measures are nonlinearly converted into a single performance score OPS. Thus, we assume a constant IR to make the incentive contracts easier for the participants to understand.⁸

Business Life-Cycle

We manipulate the SBUs' life-cycle stage as either mature or growth. Recall that the WS is portrayed as a mature-stage SBU and the FS is portrayed as a growth-stage SBU. As shown in Appendix 2, we capture the differences between the WS and the FS with two experimental features: (1) the effort cost at each effort level is set to be smaller for the WS than for the FS to reflect the fact that it is relatively easier for the WS manager than for the FS manager to meet or exceed the targets; and (2) the ranges of possible realized measures are set to be wider for the FS than for the WS to reflect the fact that the FS is more risky due to its growth-stage status.

Dependent Variables

Our two dependent variables are the managers' effort level choices and their overall performance scores (OPS). The WS and FS managers first choose an effort level for each of the four BSC perspectives; the managers may choose their effort levels strategically in response to the incentive contract in place. After the managers make their effort level choices for each of the four BSC perspectives, the computer determines the realized performance measures from a uniform distribution over the pre-specified range corresponding to the effort level, and calculates the OPS as described earlier.

⁸ We acknowledge that our contracts may not fully capture all the idiosyncrasies of real world contract forms. Nevertheless, we believe that the contracts capture the essence of commonly used contracts. Furthermore, the contracts are simple enough for participants to understand. Kaplan and Norton (2001, Chapter 11) and Kaplan and Norton (2006, Chapter 10) discuss other forms of contract, but most of them are not amenable to experiments due to their complexity or lack of detailed descriptions.

IV. RESULTS

Recall that we assigned our 100 participants randomly and evenly to one of five experimental sessions. Thus, we analyze data comprising 20 independent replications of each of the five sessions. Further, each participant completed 40 periods. Therefore, in the results reported below, one observation represents the *average* of the 40 periods played by the same participant. Finally, because a participant's behavior tends to converge to a stable pattern over time, we also examine their average behavior in the first 30 periods and in the last 10 periods, whenever it is applicable.

Individual Effect of Incentive Contract Type on Managers' Effort Level Choices and Performance – Tests of H1

Recall that H1 predicts that, for each BSC perspective, managers' effort level choices will increase with increases in the strength of the association between the achievement of BSC performance targets and managerial compensation. As shown in Panel A of Table 2, CONTRACT significantly affects managers' effort level choices across the four BSC perspectives ($p < 0.000$).

[Insert Table 2 here]

Because we are interested in the order of managers' effort across the five incentive contracts, we conduct planned multiple-comparison tests of the overall 40-period mean levels of effort chosen by managers in each incentive contract condition.⁹ Panels A through D of Table 3 show that all 16 comparisons are in the predicted direction, and 13 of them are statistically significant (all p -values < 0.10 , one-tailed). Overall, our results support H1.

Two of our findings from Table 3 warrant further discussion. First, for the two BSC

⁹ We use the Dunn-Šidák procedure because it has higher statistical power than the Dunn procedure (also called the Bonferroni t-test) in multiple comparison analyses (Kirk 1982, 111).

perspectives with the highest weights—financial and internal processes—managers’ effort level choices are higher for the PW contract than for the PR contract. This result supports the argument that managers choose higher effort levels when their bonus rate b increases continuously in OPS than when the bonus rate b increases discontinuously in OPS. Second, the overall 40-period mean effort level for managers who received the T contract is 4.793 ($s.d. = 0.115$) in the financial perspective and it is 4.138 ($s.d. = 0.225$) in the internal process perspective. These overall mean effort levels for managers who received the T contract are significantly higher than the overall means in the other four contracts. The results with respect to the internal process perspective suggest that, if appropriately designed, threshold contracts can facilitate the primary objective of the BSC, which is to induce managers to focus on non-financial performance measures. At the same time, the results with respect to the financial perspective suggest that threshold contracts that put more weight on financial performance measures can have the opposite effect, thus defeating the primary objective of the BSC.¹⁰

[Insert Table 3 here]

Individual Effect of Life-Cycle Stage on Effort Level Choices and Performance – Tests of H2(a) and H2(b)

H2(a) predicts that across the four BSC perspectives, managers of growth-stage SBUs will choose higher effort than managers of mature-stage SBUs. H2(b) predicts that across the four BSC perspectives, the overall performance of managers of growth-stage SBUs will be higher than the overall performance of managers of mature-stage SBUs.

We first conduct a *macro-level* test of our hypotheses using ANOVAs. Panel A of Table 2

¹⁰ We also used traditional t -tests of paired comparisons between the five incentive contracts for each of the BSC perspectives. Our results indicate that all 16 comparisons are in the predicted direction, and 11 of them are statistically significant (all p -values < 0.10). These results are generally consistent with our planned multiple comparisons tests.

shows that, across the five incentive contracts, the main effects of LIFE-CYCLE are all significant across the four BSC perspectives (all p -values < 0.02). In addition, Panel B of Table 2 reports that LIFE-CYCLE significantly affects managers' overall performance ($F = 2.913$, $p < 0.091$). These results suggest that SBU's life-cycle stage individually affects managers' effort level choices and their resulting performance. Our finding contributes to the BSC literature by experimentally showing that life-cycle stage matters. This finding is important because it supports the view that supervisors should take the SBUs' life-cycle stage into consideration when evaluating managers' performance relative to BSC performance measures.

Next, we conduct a *micro-level* test of H2(a) and H2(b) using t tests. Decomposing the data by incentive contract type, Table 4 and Figure 3 report the 40-period averages of the mature-stage (WS) and the growth-stage (FS) store managers' effort levels for the five incentive contracts. Table 4 also shows the average effort level choices of the WS and FS managers broken down into the first 30 periods and the last 10 periods. As shown in the last column of Table 4, averaged over the 40 periods, FS managers choose significantly higher effort levels than WS managers across the four BSC perspectives, but only for managers who received the PW, PR, and T contracts. Notice that there are no significant differences in the effort level choices of managers who received either the subjective (S) or the simple-linear (SL) contracts. Taken together, these results suggest that contracts that do not tie managerial compensation to the achievement of BSC targets (e.g., simple-linear contract), or that are associated with high levels of uncertainty about how achievement of BSC targets is tied to managerial compensation (e.g., subjective contract), have detrimental effects on managers' effort levels, regardless of the life-cycle stage of the business.

[Insert Table 4 and Figure 3 here]

Further, Table 4 and Figure 3 show that, for the financial perspective in the subjective contract, the 40-period mean effort levels for the WS and the FS managers are 4.3275 and 4.4375, respectively. Unreported *t*-tests show that these effort levels are significantly higher than those chosen for the other three BSC perspectives in the subjective contract (ranging between 3 and 3.6). These findings suggest that managers of both mature-stage and growth-stage stores choose high effort levels to try to increase their bonus rate *b* (rather than choose the lowest effort level to try to decrease their effort costs). Therefore, they likely focus on the financial perspective with the expectation that the supervisor will subjectively put greater weights on the financial measures. Finally, managers of both the mature-stage and growth-stage stores choose the lowest effort levels in the SL (benchmark) contract because, as indicated earlier, this contract does not link compensation to achievement of BSC targets. Therefore, the SL contract provides little or no incentives for managers to choose higher effort levels.¹¹ Taken together, our results support H2(a).

Table 5 shows the average overall performance score (OPS) of managers for the mature-stage store (WS) and the growth-stage store (FS) broken down into the first 30 periods, the last 10 periods, and the overall 40 periods for each of the five incentive contracts. As shown in Table 5, and graphically in Figure 4, the 40-period mean OPS for the growth-stage (FS) store managers are significantly higher than the 40-period mean OPS for the mature-stage (WS) store managers, but only for those who received the PW, PR, and T contracts. Interestingly, the WS managers who received either the subjective (S) or simple-linear (SL) contracts significantly

¹¹ All participants under the SL contract chose the minimum level of effort under both lifecycle stages (average one with zero standard deviation in all eight cells) during periods 31-40. Because the SL contract is an extreme case in which the participants are paid a fixed bonus rate regardless of their performance, they should discern the lack of link between the BSC measures and the monetary reward and react accordingly by choosing the minimum effort level in order to minimize their effort costs. The low average in periods 1-30 indicates that most participants noted the lack of linkage reasonably quickly, and all of them noted the lack of linkage by period 31.

outperform the FS managers. We conjecture that this result may be explained by the fact that, although managers of both SBUs who received either contract exert similar effort levels (as shown in Table 4), the FS managers also received wider ranges of possible realizations in all four BSC perspectives. Taken together, our results support H2(b).

[Insert Table 5 and Figure 4 here]

Effects of Managers' Perceptions of the Pay-BSC Performance Link on Effort Level

Choices and Performance – Tests of H3(a), H3(b), and H3(c)

Recall that H3(a) predicts that managers' perceptions of whether the BSC performance measures are appropriately linked to their compensation will be affected by the incentive contract type. H3(b) predicts that managers' effort level choices will be affected by their perceptions of whether the BSC performance measures are appropriately linked to their compensation, and H3(c) predicts that managers' overall performance will be affected by their effort level choices. Taken together, these hypotheses predict a causal path between incentive contracts, managers' link perceptions, managers' efforts, and managers' performance. Thus, we use causal path analyses and structural equation modeling to test H3, and control for the SBU's life-cycle stage.

We follow Stevens (2002) and Libby et al. (2004) to capture participants' perceptions of whether the link between the BSC performance measures and their incentive contract is appropriate (denoted by *LINK*). We elicit managers' perceptions using the following question: "Do you think that the link between your Balanced Scorecard performance measures and your incentive contract is appropriate?" We use a five-point response scale anchored at the lower end by "strongly inappropriate" and at the higher end by "strongly appropriate." Across the two life-cycle stages, the means (standard deviations) of participants' responses under the PW, PR, T, S, and SL contracts are 4.95 (0.224), 4.75 (0.444), 4.45 (0.510), 1.60 (0.601), and 1.00 (0.000),

respectively. All pairwise mean comparisons are significantly different from each other (all p 's < 0.08, two-tailed).

To test our hypotheses, we estimate the following set of equations using the variance-based structural equation modeling technique (Wold 1982):

$$LINK_i = \beta_0 + \beta_1 CONTRACT_i + \beta_2 LIFE-CYCLE_i + \varepsilon_i \quad H4(a)$$

$$EFFORT_i = \beta_0 + \beta_1 LINK_i + \beta_2 LIFE-CYCLE_i + \varepsilon_i \quad H4(b)$$

$$OPS_i = \beta_0 + \beta_1 EFFORT_i + \beta_2 LIFE-CYCLE_i + \varepsilon_i \quad H4(c)$$

where,

- $LINK_i$ = participant i 's perception of whether the link between the BSC performance measures and his/her incentive contract was appropriate (5-point scale);
- $CONTRACT_i$ = 1 if participant i received the performance-weighted (PW) contract, 0 otherwise;
= 1 if participant i received the threshold (T) contract, 0 otherwise;
= 1 if participant i received the performance-rating (PR) contract, 0 otherwise;
= 1 if participant i received the simple-linear (SL) contract, 0 otherwise;
- $EFFORT_i$ = the average of participant i 's effort level choices across 40 periods for a specific BSC perspective;
- OPS_i = the average of participant i 's OPS across 40 periods;
- $LIFE-CYCLE_i$ = 1 if participant i received the mature-stage SBU (WS) and 0 for the growth-stage SBU (FS);
- ε_i = the residual term.

Figure 2 shows the results of our causal path analyses, controlling for life-cycle. As shown in the Figure, incentive contract type significantly affects managers' link perceptions (standardized $\beta_1 = 0.812$; $p < 0.000$), thus supporting H3(a). Further, managers' link perceptions significantly affect their effort level choices (standardized $\beta_1 = 0.824$; $p < 0.000$), thus supporting H3(b). Finally, managers' effort level choices significantly affect their overall performance

(standardized $\beta_1 = 0.945$; $p < 0.000$), thus supporting H3(c).¹²

[Insert Figure 2 here]

Taken together, the results of our causal path analyses suggest that managers' perceptions of the pay-BSC performance association mediate the effects of the incentive contract on managers' effort level choices. Thus, we also ran an augmented ANCOVA model that includes LINK as a covariate and EFFORT as the dependent variable. Our results (not reported here) show that the LINK covariate significantly affects managers' effort level choices, but only in the financial perspective ($F = 7.269$; $p < 0.008$). Furthermore, after controlling for LINK, the main effects of CONTRACT (all p -values < 0.000) and LIFE-CYCLE (all p -values < 0.012) on managers' effort level choices remain significant across the four BSC perspectives, while the effect of the CONTRACT \times LIFE-CYCLE interaction remains insignificant. These results are consistent with the ANOVA results reported in Panel A of Table 2.

Also, we ran an augmented ANCOVA model that includes LINK as a covariate and OPS as the dependent variable. Our results (not reported) show that the LINK covariate significantly affects OPS ($F = 4.535$; $p < 0.036$). Furthermore, after controlling for LINK, the main effects of CONTRACT and LIFE-CYCLE are significant ($p < 0.000$ and $p < 0.077$, respectively, two-tailed). The CONTRACT \times LIFE-CYCLE interaction is also significant ($p < 0.001$). These results are consistent with the ANOVA results reported in Panel B of Table 2.

Supplementary Analyses—Joint Effects of Incentive Contract Type and Life-Cycle on Managers' Effort Level Choices and Performance

Panel A of Table 2 shows that the effect of the CONTRACT \times LIFE-CYCLE interaction

¹² Due to our relatively small sample size, we estimate the structural equation parameters using bootstrapping with 2,000 replications. The bootstrapping's p -values measure the *achieved significance level* (ASL) using the percentage of times the t -statistic from the bootstrap samples is less than the t -statistic from the original data. See Efron and Tibshirani (1993) for detailed discussions of bootstrap t tests.

on managers' effort level choices is not significant for any of the four BSC perspectives. In contrast, Panel B of Table 2 shows that the effect of the interaction on managers' performance (OPS) is significant ($F = 5.785, p < 0.000$).¹³ Simple main effect tests (not shown) indicate that, except for the financial perspective, life-cycle marginally ($p < 0.099$, two-tailed) affects managers' effort level choices, but only when the incentive contracts directly link managerial compensation to the achievement of the BSC performance targets (i.e., the PW, T, and PR contracts). These findings are consistent with the descriptive statistics and t-tests reported in Table 4 and shown graphically in Figure 3 regarding the effects of life-cycle on managers' effort level choices.

V. SUMMARY AND DIRECTIONS FOR FUTURE RESEARCH

We address an overarching research question that has received little attention by prior accounting research: Do Balanced Scorecard incentive contract type and business life-cycle affect managerial effort and performance? Our empirical results from a laboratory experiment yield several important findings. First, incentive contracts that directly link managerial compensation to the achievement of BSC targets induce managers to choose higher effort levels, and to achieve higher performance, relative to incentive contracts in which managerial bonuses are either subjectively determined, or are not directly linked to the achievement of BSC performance targets. Second, managers of growth-stage stores choose higher effort levels and achieve higher performance than their counterparts in mature-stage stores. Importantly, the effect of life-cycle on managers' effort level choices is stronger when the incentive contracts directly link managerial compensation to the achievement of the BSC performance targets. Third, managers' perceptions of whether their bonuses are appropriately linked to the BSC performance

¹³ Since each manager's realized performance measures across the four BSC perspectives have been translated into a single performance score OPS, there is only one main effect for each of the two treatment variables and one interaction term in Table 2.

measures play a mediating role between incentive contract type and managers' effort level choices and performance. Finally, we find that SBU's life-cycle and incentive contract type jointly affect managers' overall performance, even though they do not jointly affect their effort level choices.

To our knowledge, this is the first study to document the individual and joint effects of incentive contract type and SBU life-cycle stage on managers' effort and performance. Taken together, our findings suggest that, when designing incentive contracts that incorporate BSC performance measures, the extent to which the strength of the link between achievement of BSC targets and managerial compensation affects managers' effort and performance is not independent of the SBU's life-cycle stage. This is also the first study to document the mediating role that managers' perceptions of the pay-BSC performance link play between the incentive contract type and managers' effort and performance.

Some features of our study and experiment point to several directions for future research. First, our examination of the joint effects of incentive contract type and life-cycle is exploratory. Our findings suggest that more research is needed to probe deeper into the interactive effects of these variables on managers' effort and performance. Second, our experiment does not allow the store manager to interact with a supervisor. A possible extension of our study could incorporate a supervisor who evaluates the manager's achievement of the BSC performance targets determined by the manager's effort level choices. Third, in our experiment managers' effort level choices in one period have no consequences for their performance in subsequent periods. Our design choice was motivated primarily by our goal of reducing complexity in our experiment. We acknowledge that in practice, BSC performance measures include both leading and lagging indicators of performance. Thus, future research could endeavor to examine the lagging effects of BSC

performance measures as a function of managers' effort choices. Such studies will likely require making trade-offs between internal versus external validity.

Fourth, in our experiment managers' effort level choices are neither complements nor substitutes (e.g., see Dikolli and Kulp 2002). Specifically, if we assume that two effort levels are complements, then this implies that exerting effort on one task results in a lower marginal cost to perform a different task. In contrast, if we assume that two effort levels are substitutes, then this implies that exerting effort on one task results in a higher marginal cost to perform a different task. Thus, future studies could investigate these interactive effects on managers' effort and performance.

Finally, we simplify the experimental setting and focus on what, in our view, are the key forces that may affect the success of a Balanced Scorecard system implementation. We acknowledge that managers' actual effort level choices take place in an environment that is substantially more complex than the one examined in this paper. For instance, managers may be concerned with how their effort level choices and performance affect their long-term career planning, induce peer pressure, change the behavior of their competitors, achieve a firm's long-term strategic goals, and affect investors' valuation of firms' equity values. Clearly, there are tensions between the managers' incentives to maximize their bonuses and their effort level choices. Our study has explored some of the key forces that contribute to these tensions. Future studies may consider some of the factors mentioned above to provide a more comprehensive framework for a successful Balanced Scorecard implementation.

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FIGURE 1
Sequence of Actions

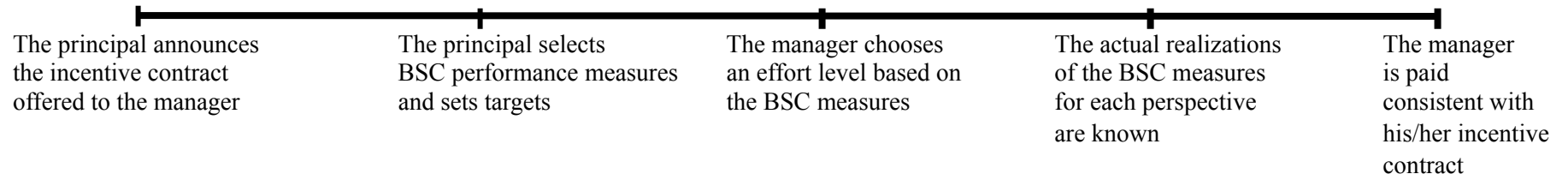
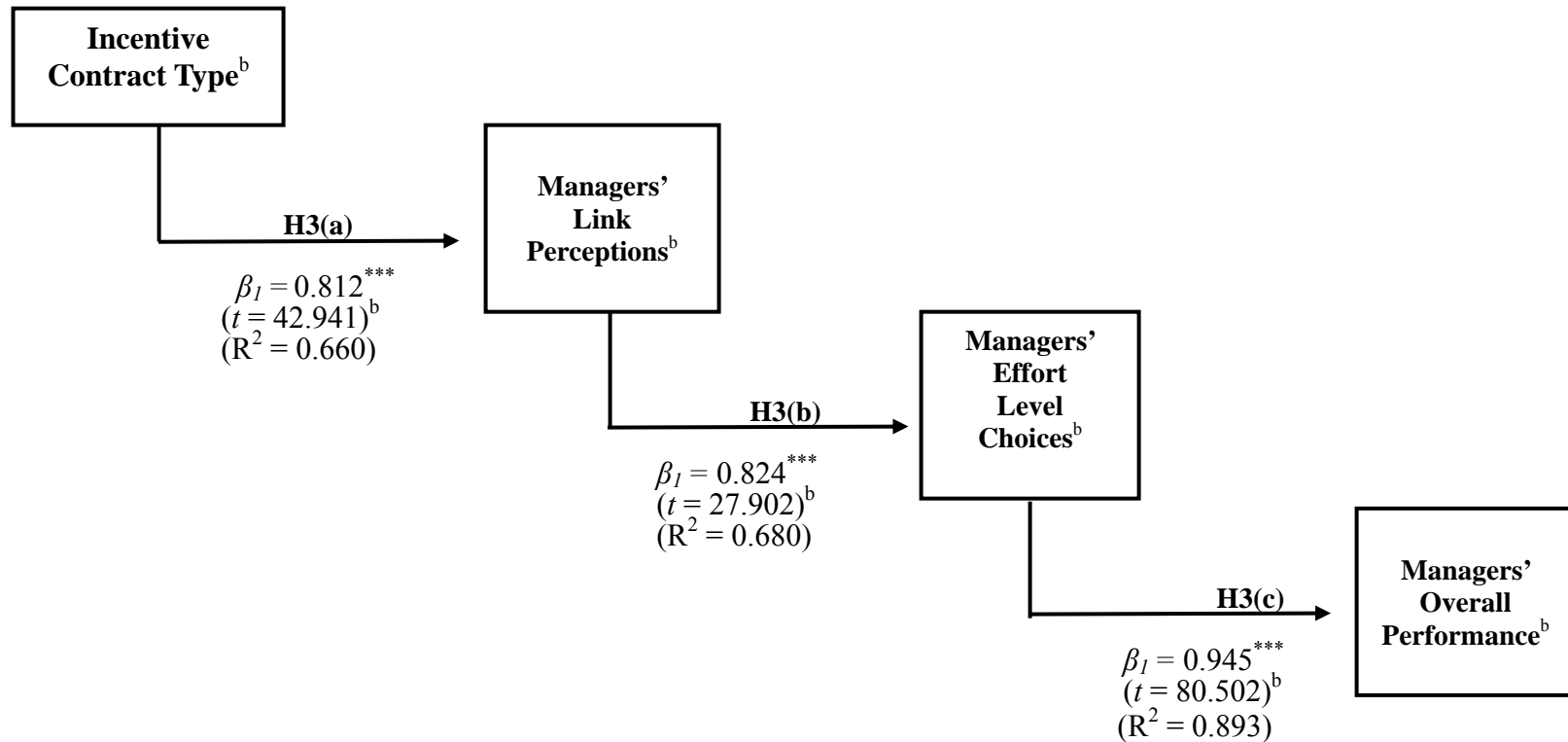


FIGURE 2
Causal Path Analyses: Contract Type, Managers' Link Perceptions, Managers' Effort Choices, and Overall Performance (H3)
– Structural Equations Estimated Using Partial Least Squares (n = 100)^a



^a The arrows depict the causal path (Wold 1982) linking incentive contract type, managers' perception about the link between BSC performance measures and compensation, managers' effort level choices, and their overall performance, controlling for the SBU's life-cycle.

^b The partial least squares employs an iterative process to compute a set of simple and multiple ordinary least squares (OLS) regressions that minimize the set of residual variance for the variables examined. Due to our relatively small sample size, we estimate the structural equation parameters using bootstrapping with 2,000 replications. The structural equation parameters are *standardized* regression coefficients.

*, **, and *** indicate two-tailed significance at the 0.10, 0.05, and 0.01, levels, respectively.

FIGURE 3

Effects of Life-Cycle on Managers' Mean Effort Levels, by Incentive Contract Type (H2a)

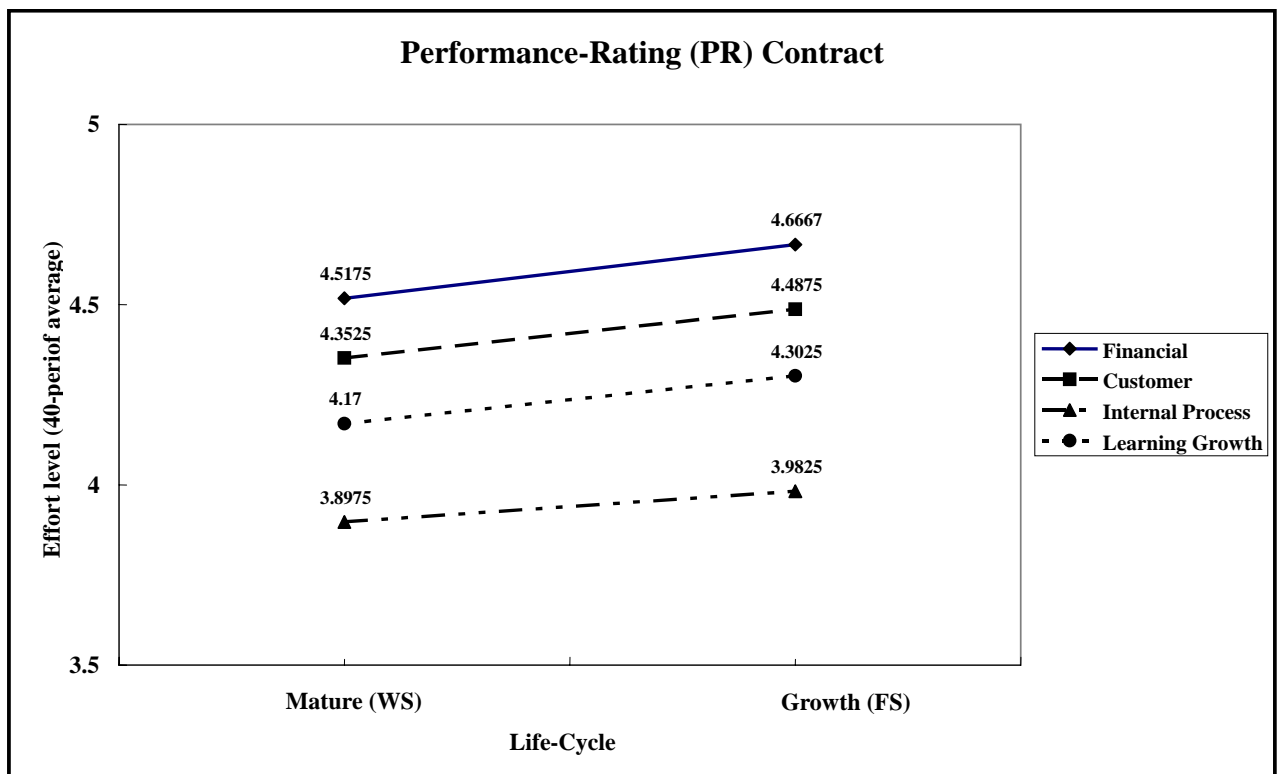
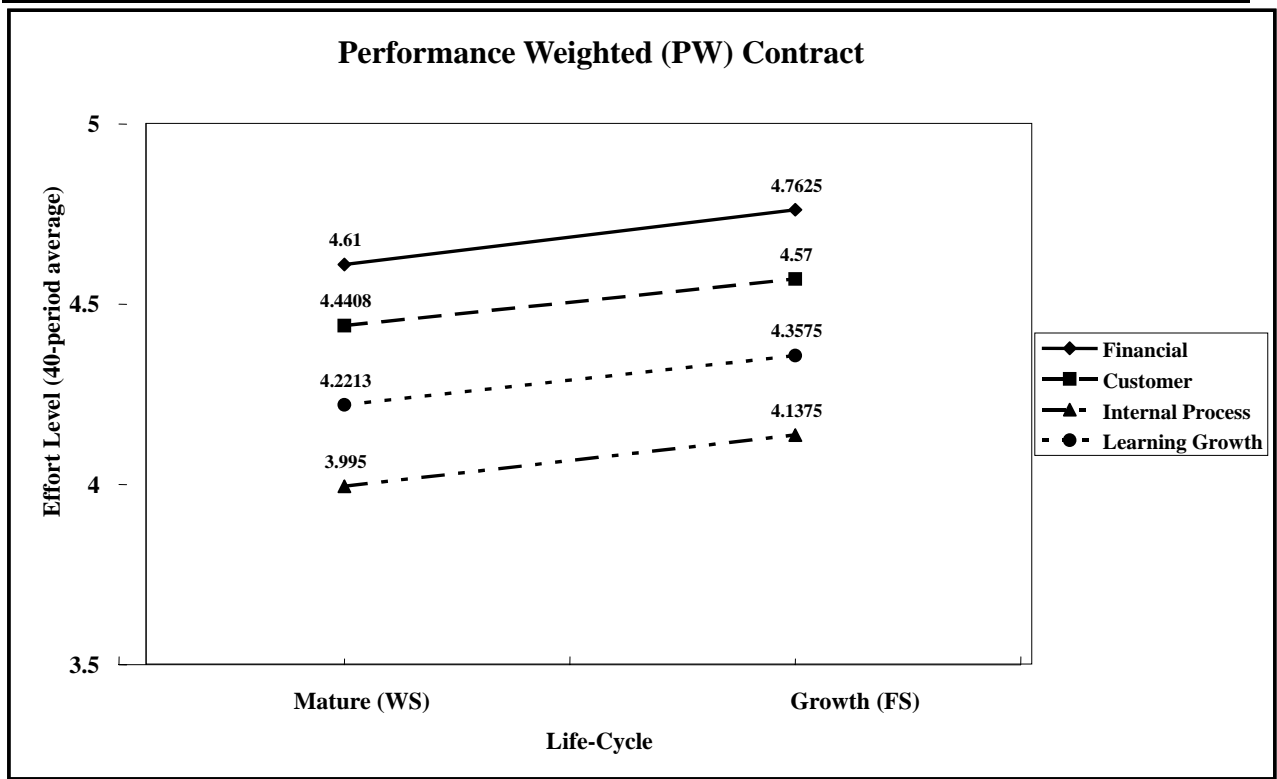


FIGURE 3 (continued)
Effects of Life-Cycle on Managers' Mean Effort Levels, by Incentive Contract Type (H2a)

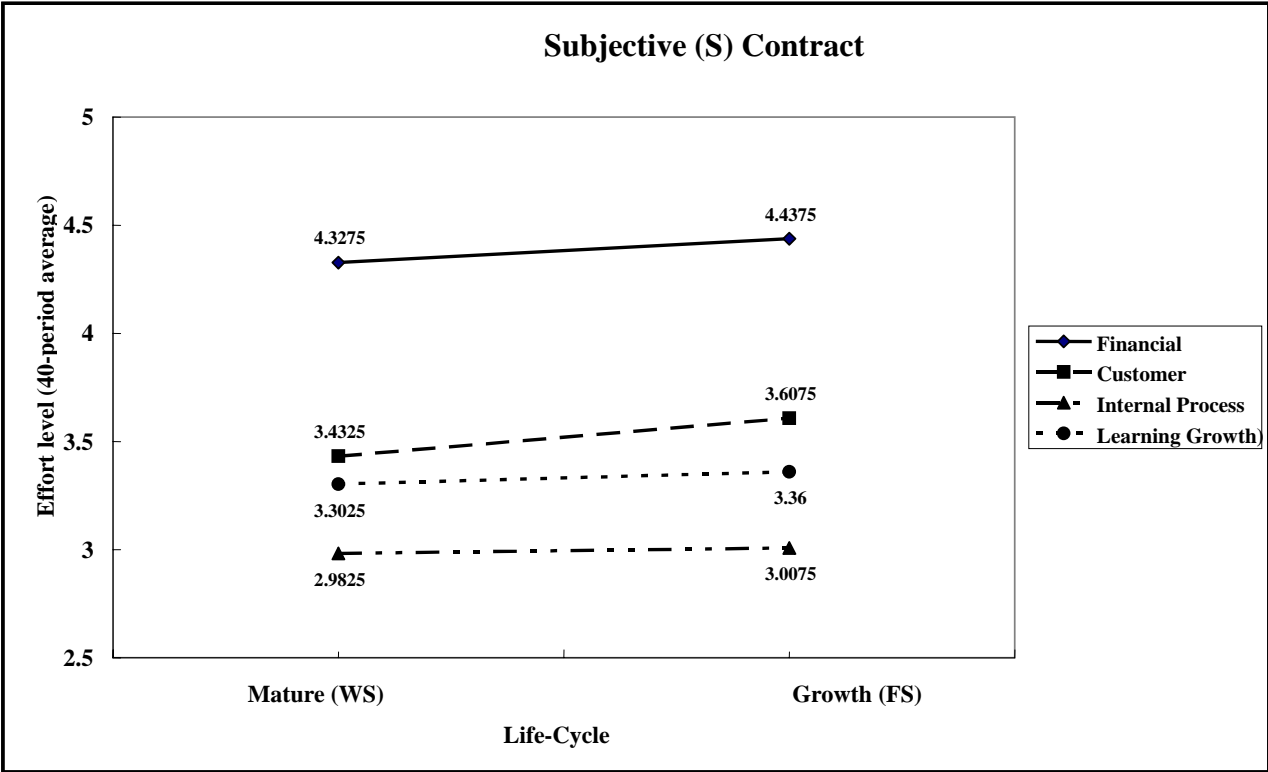
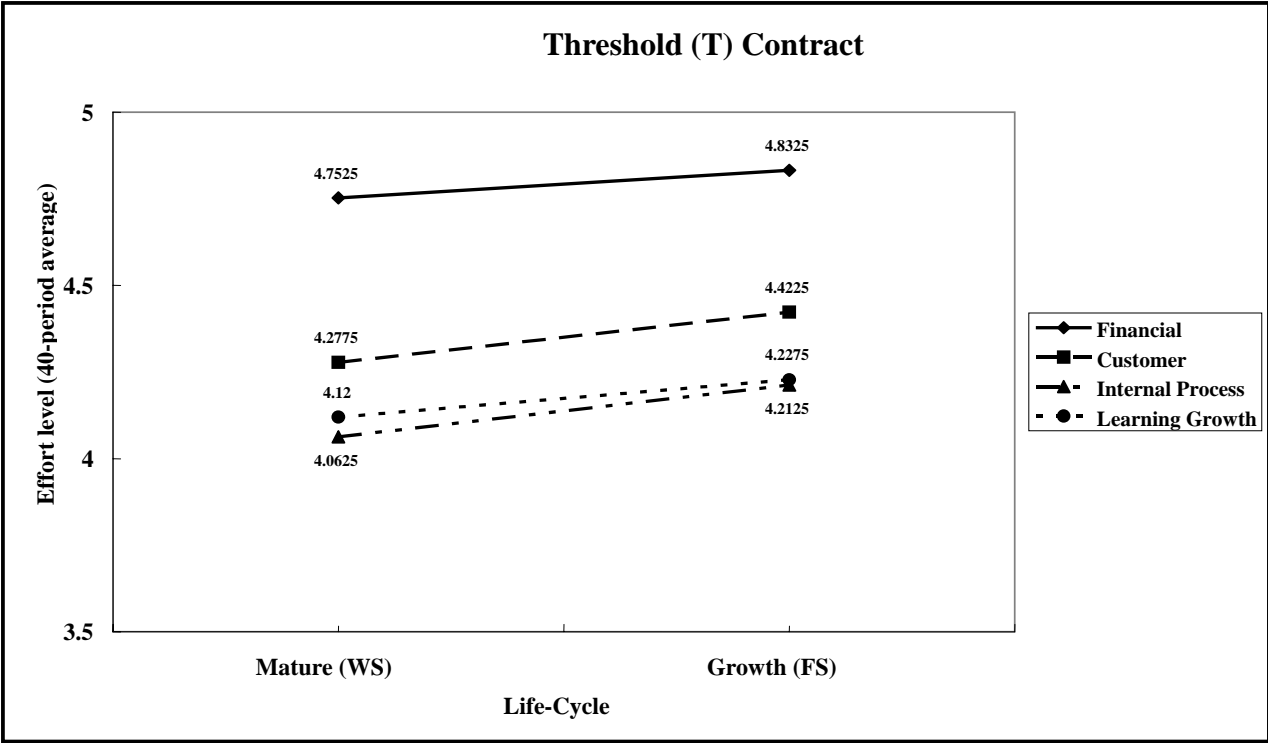


FIGURE 3 (continued)
Effects of Life-Cycle on Managers' Mean Effort Levels, by Incentive Contract Type (H2a)

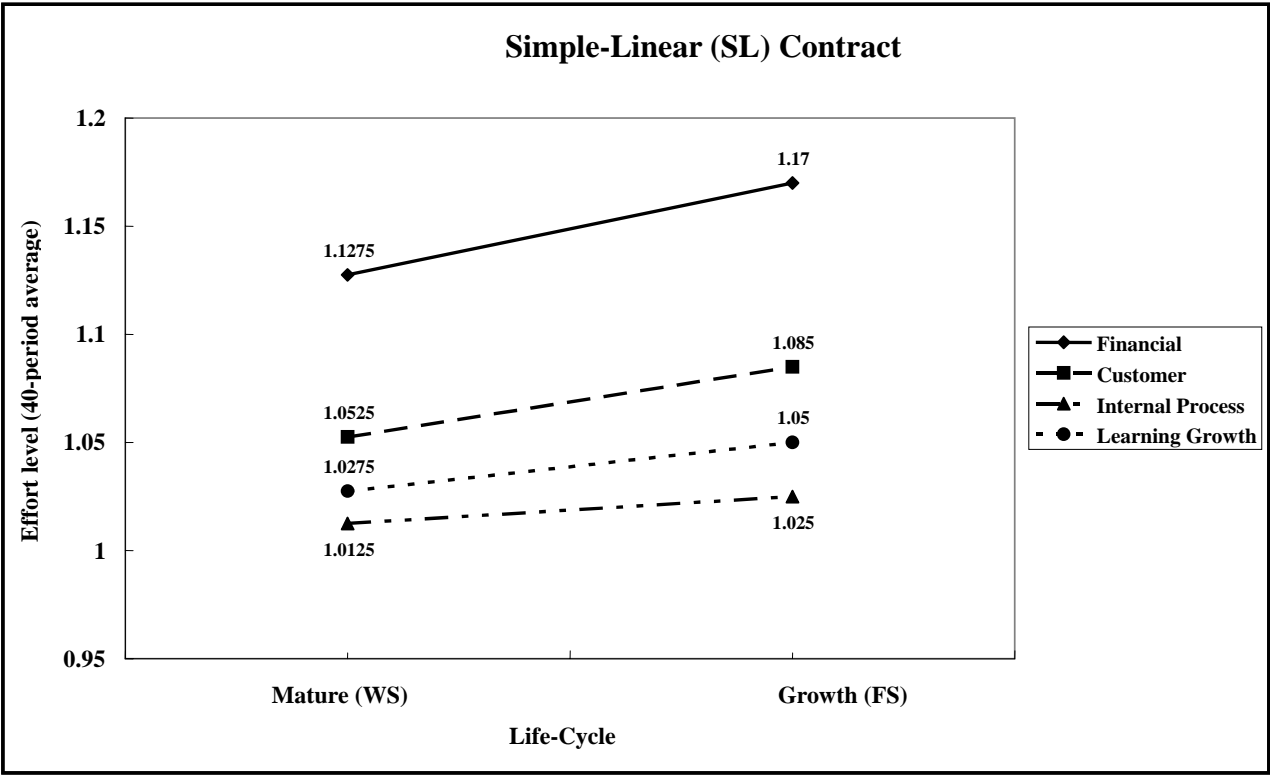


FIGURE 4
Effects of Life-Cycle on Managers' Overall Performance Score (40-Period Average), by Incentive Contract Type (H2b)

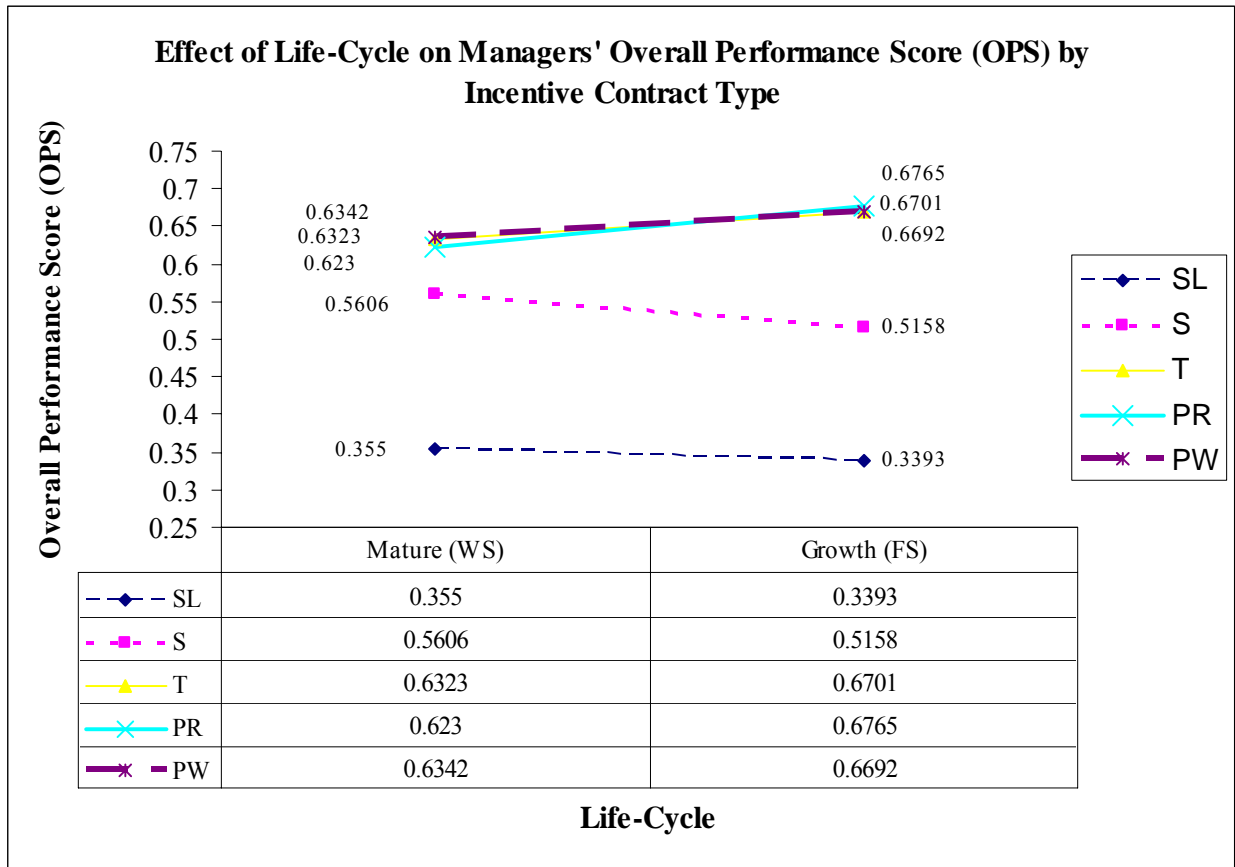


TABLE 1
Comparisons of BSC Incentive Contracts (assuming a contract of the form $a + b \times [\text{bonus pool}]$)

Contract Types	Sources	Key Features	Determination of Bonus Rate b
Performance-weighted (PW)	Malina and Selto (2001)	(a) Considers manager's performance on all BSC measures. (b) Bonus rate $b = \text{OPS}$ and hence increases continuously in OPS.	$b = \text{OPS}$, where $\text{OPS} = \sum_{i=1}^8 [\text{Performance Score}_i \times \text{Measure Weight}_i],$ Performance Score _{<i>i</i>} is as defined in Appendix 2, and <i>i</i> corresponds to BSC measure <i>i</i> .
Performance-rating (PR)	Kaplan and Norton (2001)	(a) Considers manager's performance on all BSC measures. (b) Bonus rate b increases discontinuously in OPS.	(a) Compute OPS for each manager using all 8 BSC measures, as in the PW contract. (b) Determine bonus rate based on a predetermined set of five categories (ranges of OPS) with different pre-assigned bonus rates. (c) $b =$ corresponding bonus rate based on range in which the actual OPS lies.
Threshold (T)	Niven (2001)	Only considers manager's performance on those BSC measures for which the actual value exceeds the target.	$b = \sum_{j=1}^K [I_j \times \text{MeasureWeight}_j]$, where $I_j = 1$ if the actual value of BSC measure <i>j</i> equals or exceeds the associated target, and 0 otherwise.
Subjective (S)	Ittner et al. (2003)	(a) Considers manager's performance on some BSC measures and other non-BSC measures. (b) The bonus rate b is subjectively determined following the algorithm found in Ittner et al. (2003).	Subjectively determined (partially based on some BSC measures)
Simple-linear (SL)	Benchmark	A fixed bonus rate b is given, regardless of the manager's performance on any BSC measure.	$b = 0.733$ (constant)

TABLE 2
ANOVA Results of Effects of Incentive Contract Type and SBU Life-Cycle on Managers' Effort Level Choices and Performance – Tests of H2(a) and H2(b)

Panel A: Dependent variable is managers' effort level choices (n = 100)

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F-statistic</i> ^b	<i>p-value</i>
Main Effects of CONTRACT^a					
Financial	193.877	4	48.469	987.872	< 0.000
Customer	169.292	4	42.323	1412.252	< 0.000
Internal process	139.437	4	34.859	1482.142	< 0.000
Growth and learning	153.365	4	38.341	1638.191	< 0.000
Main Effects of LIFE-CYCLE (H2a)^a					
Financial	0.285	1	0.285	5.815	< 0.018
Customer	0.380	1	0.380	12.690	< 0.001
Internal process	0.172	1	0.172	7.323	< 0.008
Growth and learning	0.208	1	0.208	8.894	< 0.004
CONTRACT × LIFE-CYCLE					
Financial	0.044	4	0.011	0.223	< 0.925
Customer	0.058	4	0.014	0.482	< 0.749
Internal process	0.082	4	0.024	0.870	< 0.485
Growth and learning	0.049	4	0.012	0.526	< 0.717

Panel B: Dependent variable is managers' overall performance scores (OPS) (n = 100)

Main Effects					
CONTRACT ^a	1.405	4	0.351	235.682	< 0.000
LIFE-CYCLE (H2b) ^a	0.004	1	0.004	2.913	< 0.091
Interaction					
CONTRACT × LIFE-CYCLE	0.034	4	0.009	5.785	< 0.000

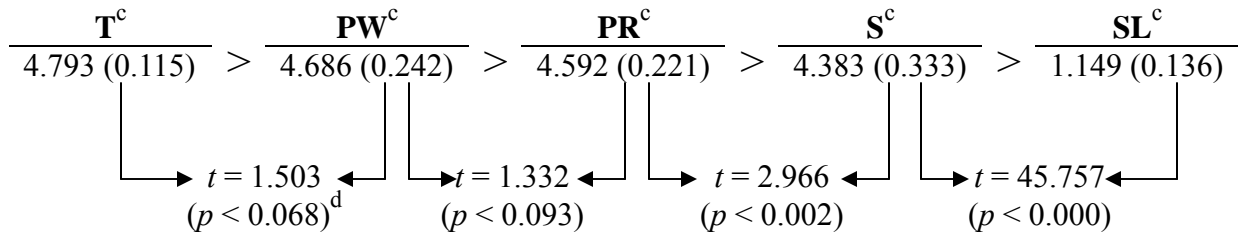
TABLE 2 (continued)
ANOVA Results of Effects of Incentive Contract Type and SBU Life-Cycle on Managers' Effort Level Choices and Performance – Tests of H2(a) and H2(b)

^a We use a between-subjects experiment with two treatment variables, *CONTRACT* (manipulated at five levels) and *LIFE-CYCLE* (manipulated at two levels). We randomly assigned participants to one of the two life-cycle conditions (mature-stage vs. growth-stage), and to one of the five incentive contracts: a *performance-weighted* (PW) contract in which the SBU manager's bonus rate equals the overall performance score (OPS), which is a weighted average of the manager's performance scores on the BSC measures; a *performance rating* (PR) contract in which the bonus rate determination is similar to that under the PW contract except that the bonus rates are based on five categories (ranges) of the OPS; a *threshold* (T) contract in which the bonus rate is computed as the sum of the pre-assigned weights for those BSC measures that meet or exceed the targets; a *subjective* (S) contract in which the bonus rate is subjectively determined following an algorithm found in Ittner et al. (2003); and a *simple linear* (SL) contract (or the benchmark contract), in which the SBU manager is compensated with a fixed bonus rate regardless of his/her performance on the measures for the four BSC perspectives.

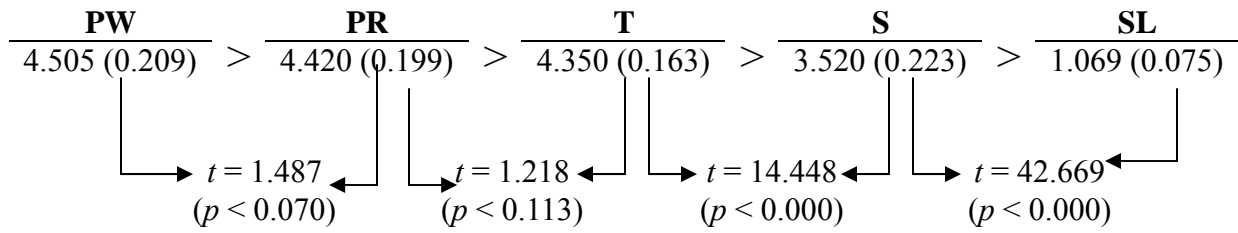
^b In calculating the *F* statistics, the degrees of freedom are adjusted by the Huynh-Feldt procedures. This adjustment (also called the Box adjustment) is usually recommended in repeated measures design when the sphericity assumption for using the *F* test may not be met.

TABLE 3
Planned Multiple Comparison Tests of the Effect of Incentive Contract Type on Managers' Effort Level Choices (H1)^a
--Using the Dunn-Šidák Procedure^b

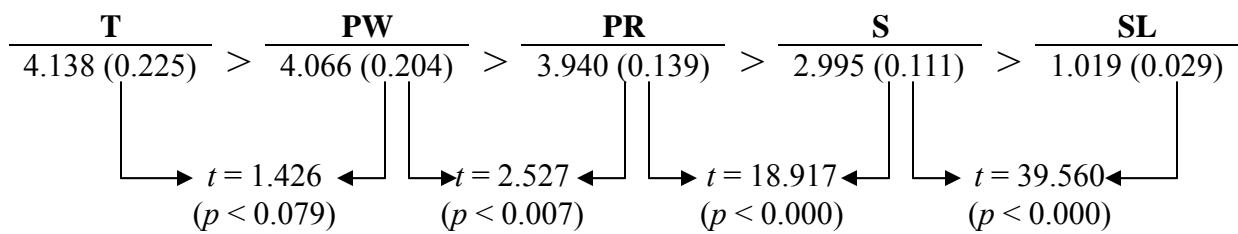
Panel A: Financial (40% weight)



Panel B: Customer Perspective (20% weight)



Panel C: Internal Process (25% weight)



Panel D: Learning and Growth (15% weight)

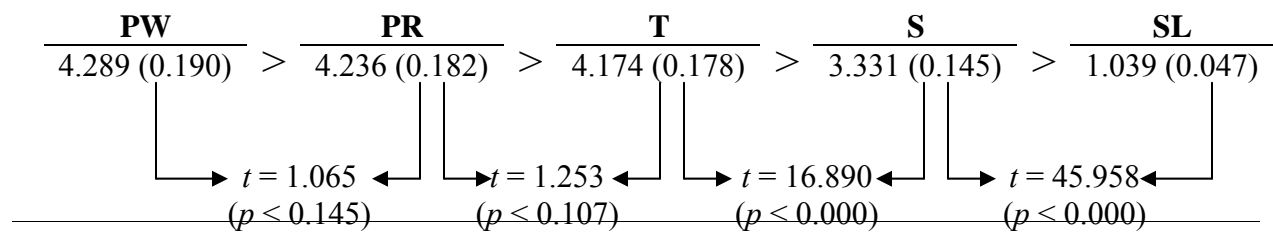


TABLE 3 (continued)
Planned Multiple Comparisons of the Effect of Incentive Contract Type on Managers’
Effort Level Choices (H1)^a
--Using the Dunn-Šidák Procedure^b

Footnotes to Table 4:

- ^a Entries represent the overall 40-period average level of effort chosen by participants in each incentive contract condition (standard deviations in parentheses).. Possible effort choices ranged from 1 (lowest level) to 5 (highest level) for each of the four BSC perspectives.
- ^b See Kirk (1982, 111) for the formula to compute the Dunn-Šidák t-statistic.
- ^c T = threshold; PW = performance-weighted; PR = performance-rating; S = subjective; SL = simple-linear. See Table 1 and footnote a of Table 2 for description of incentive contracts.
- ^d All *p*-values are one-tailed

TABLE 4
Descriptive Statistics and Test of H2(a): Effects of SBU Life-Cycle on Managers' Effort Level Choices^a

BSC Incentive Contract ^b	BSC Perspectives	The Women's Store (Mature-Stage) ^b			The Family Store (Growth-Stage) ^b			<i>t</i> tests of averages over 40 periods (n = 20) ^c
		Average (1-30 periods)	Average (31-40 periods)	Average (40 periods)	Average (1-30 periods)	Average (31-40 periods)	Average (40 periods)	
Performance-weighted (PW)	Financial	4.5333 (0.3399)	4.8400 (0.1350)	4.6100 (0.2829)	4.6967 (0.2391)	4.9600 (0.0699)	4.7625 (0.1757)	-1.4481*
	Customer	4.3067 (0.2552)	4.8433 (0.0930)	4.4408 (0.2056)	4.4467 (0.2530)	4.9400 (0.0843)	4.5700 (0.2006)	-1.4217*
	Internal Process	3.9600 (0.2142)	4.1000 (0.1247)	3.9950 (0.1866)	4.1267 (0.2232)	4.1700 (0.1567)	4.1375 (0.2039)	-1.6303*
	Learning Growth	4.1583 (0.2830)	4.4100 (0.1912)	4.2213 (0.2341)	4.2733 (0.1235)	4.6100 (0.0738)	4.3575 (0.1054)	-1.6592*
Performance-rating (PR)	Financial	4.4467 (0.2741)	4.7300 (0.1829)	4.5175 (0.2483)	4.5900 (0.2000)	4.8967 (0.0909)	4.6667 (0.1694)	-1.4047*
	Customer	4.2200 (0.2915)	4.7500 (0.1780)	4.3525 (0.2376)	4.3633 (0.1511)	4.8600 (0.0843)	4.4875 (0.1314)	-1.5725*
	Internal Process	3.8800 (0.1573)	3.9500 (0.1080)	3.8975 (0.1441)	3.9834 (0.1381)	3.9800 (0.0919)	3.9825 (0.1253)	-1.4078*
	Learning Growth	4.1100 (0.2357)	4.3500 (0.1269)	4.1700 (0.2064)	4.2333 (0.1556)	4.5100 (0.0876)	4.3025 (0.1320)	-1.7100*
Threshold (T)	Financial	4.6800 (0.1398)	4.9700 (0.0483)	4.7525 (0.1121)	4.7767 (0.1441)	5.0000 (0.0000)	4.8325 (0.1080)	-1.6251*
	Customer	4.1667 (0.1799)	4.6100 (0.0738)	4.2775 (0.1431)	4.3000 (0.1886)	4.7900 (0.0876)	4.4225 (0.1548)	-2.1753**
	Internal Process	4.0233 (0.3155)	4.1800 (0.1932)	4.0625 (0.2836)	4.1800 (0.1317)	4.3100 (0.0876)	4.2125 (0.1197)	-1.5401*
	Learning Growth	4.0767 (0.2120)	4.2500 (0.1650)	4.1200 (0.1968)	4.1633 (0.1659)	4.4200 (0.1033)	4.2275 (0.1493)	-1.3764*

TABLE 4 (continued)
Descriptive Statistics and Test of H2(a): Effects of SBU Life-Cycle on Managers' Effort Level Choices^a

BSC Incentive Contract ^b	BSC Perspectives	The Women's Store (Mature-Stage) ^c			The Family Store (Growth-Stage) ^c			<i>t</i> tests of averages over 40 periods (n = 20) ^c
		Average (1-30 periods)	Average (31-40 periods)	Average (40 periods)	Average (1-30 periods)	Average (31-40 periods)	Average (40 periods)	
Subjective (S)	Financial	4.1400 (0.4109)	4.8900 (0.1449)	4.3275 (0.3388)	4.2700 (0.4284)	4.9400 (0.0843)	4.4375 (0.3355)	-0.6912
	Customer	3.4067 (0.2403)	3.5100 (0.1969)	3.4325 (0.2282)	3.5800 (0.1913)	3.6900 (0.1853)	3.6075 (0.1886)	-0.9650
	Internal Process	2.9633 (0.1105)	3.0400 (0.0966)	2.9825 (0.1000)	2.9900 (0.1370)	3.0600 (0.1075)	3.0075 (0.1259)	-0.9586
	Learning Growth	3.2900 (0.1089)	3.3400 (0.0966)	3.3025 (0.1044)	3.3467 (0.1737)	3.4000 (0.1944)	3.3600 (0.1784)	-1.0765
Simple-linear (SL)	Financial	1.1700 (0.1895)	1.0000 (0.0000)	1.1275 (0.1421)	1.2267 (0.1769)	1.0000 (0.0000)	1.1700 (0.1327)	-0.7296
	Customer	1.0700 (0.1012)	1.0000 (0.0000)	1.0525 (0.0759)	1.1133 (0.0996)	1.0000 (0.0000)	1.0850 (0.0747)	-0.9649
	Internal Process	1.0167 (0.0324)	1.0000 (0.0000)	1.0125 (0.0243)	1.0333 (0.0444)	1.0000 (0.0000)	1.0250 (0.0333)	-0.4918
	Learning Growth	1.0367 (0.0618)	1.0000 (0.0000)	1.0275 (0.0463)	1.0667 (0.0629)	1.0000 (0.0000)	1.0500 (0.0471)	-0.8797

^a Entries in each cell represent the average level of effort chosen by participants in each experimental condition, out of 5 points (std. deviation).

^b See Table 1 and footnote a of Table 2 for description of incentive contracts and life-cycle stages.

^c *, **, and *** indicate one-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively.

TABLE 5
Descriptive Statistics and Test of H2(b): Effects of SBU Life-Cycle on Managers' Overall Performance (OPS)^a

BSC Incentive Contract ^b	The Women's Store (Mature-Stage) ^b			The Family Store (Growth-Stage) ^b			<i>t</i> tests of averages over 40 periods (n = 20) ^c
	Average (1-30 periods)	Average (31-40 periods)	Average (40 periods)	Average (1-30 periods)	Average (31-40 periods)	Average (40 periods)	
Performance-weighted (PW)	0.6346 (0.0602)	0.6331 (0.0388)	0.6342 (0.0478)	0.6468 (0.0655)	0.7365 (0.1333)	0.6692 (0.0392)	-1.7925**
Performance-rating (PR)	0.6187 (0.0526)	0.6360 (0.0746)	0.6230 (0.0372)	0.6484 (0.0569)	0.7609 (0.1766)	0.6765 (0.0522)	-1.6828*
Threshold (T)	0.6233 (0.0418)	0.6592 (0.0599)	0.6323 (0.0403)	0.6705 (0.0270)	0.6692 (0.1079)	0.6701 (0.0326)	-2.3097**
Subjective (S)	0.5589 (0.0092)	0.5656 (0.0499)	0.5606 (0.0160)	0.4961 (0.0478)	0.5748 (0.1838)	0.5158 (0.0612)	2.2367**
Simple-linear (SL)	0.3552 (0.0106)	0.3546 (0.0748)	0.3550 (0.0111)	0.3434 (0.0149)	0.3272 (0.0678)	0.3393 (0.0129)	2.9115***

^a Entries in each cell represent managers' average overall performance scores (std. deviations).

^b See Table 1 and footnote a of Table 2 for description of incentive contracts and life-cycle stages.

^c *, **, and *** indicate one-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively.

APPENDIX 1

Experimental Instruments: Strategies of Smithson Stores' Strategic Business Units*

Participants assigned to The Women's Store read the following description of the store's strategies:

The Women's Store

The Women's Store (WS) is an established specialty retailer that caters to fashion-conscious professional women. WS's strong cash flows will be needed to fuel growth in Smithson's younger SBUs. WS will contribute to corporate objectives by using its existing store network to further penetrate its target market, while improving margins and cash flows. Accordingly, sales growth will come through the introduction of new clothing lines, such as its business casual line, and excellent in-store shopping assistance designed to accommodate style-conscious, time-constrained customers. WS will leverage its distinctive brand image to drive new clothing sales and margin growth within its target market, which is not very price sensitive. WS's goal is to become a store in which women can shop for all of their wardrobe needs, from clothing to accessories to shoes, in one convenient location. By developing skilled brand managers who can broaden its product line to accommodate "one stop shopping" and by offering greater in-store shopping assistance, WS hopes to compete with catalogue and on-line retailers. Central to WS's growth strategy is the creation of a "perfect in-store shopping experience" that will entice busy women to visit the store, rather than shop on-line or via the phone.

Participants assigned to The Family Store read the following description of the store's strategies:

The Family Store

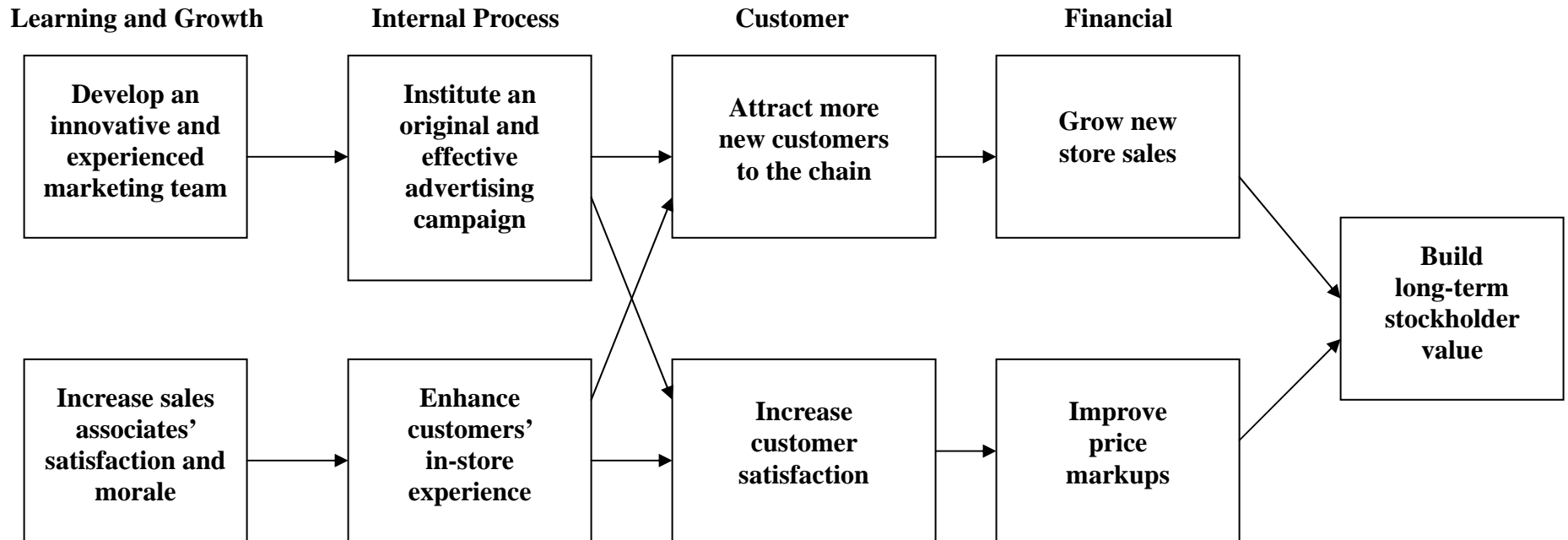
The Family Store (FS), which opened its doors three years ago, is one of several retail chains in the Smithson portfolio that is still in the "growth" stage of the business life-cycle. FS carries classic, high-quality casual clothing, such as khakis, jeans, and polo shirt for men, women, and children. Although FS offers stylish and high-quality merchandise, it is more of "fashion follower" than a "fashion leader." Therefore, unlike WS, which seeks to introduce many new product lines, FS identifies a relatively narrow set of basic and functional styles each season and offers these items in a variety of color and sizes. Management expects this new, high-end retailer to drive a significant portion of Smithson's overall growth, as FS plans to double the number of stores over the next two years.

FS's target customers are primarily young, upper middle-class families with significant disposable income, but little free time. FS's combination of classic, high-quality men's, women's and children's apparel enables busy parents to shop for the entire family in one location. To attract this customer segment to its store, FS is building an experienced marketing team that will launch an aggressive advertising campaign featuring memorable, humorous commercials appealing to all ages. Additionally, FS plans to exceed customers' shopping expectations with its fun "in-store" atmosphere, virtually appealing displays and excellent service.

* The case materials are adapted from Banker et al. (2004).

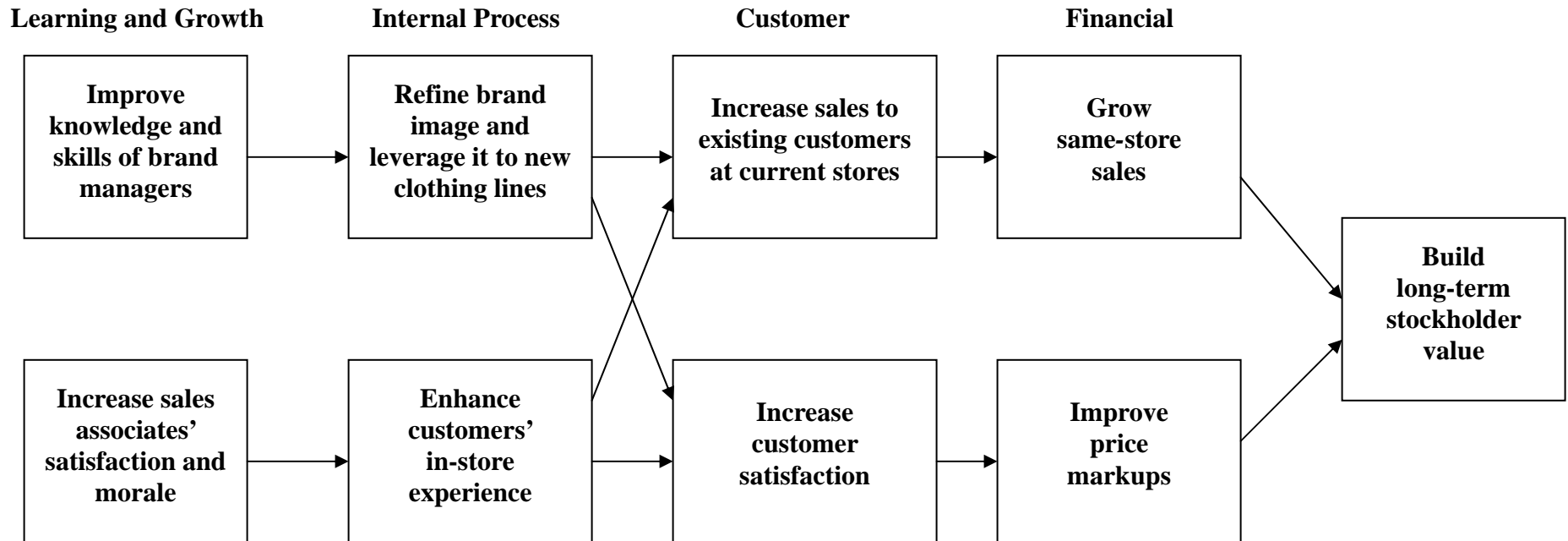
APPENDIX 1 (continued)
Experimental Instruments: Strategy Maps of Smithsonian Stores' Strategic Business Units*

Panel A: Strategic Objectives of The Family Store (FS)



APPENDIX 1 (continued)
Experimental Instruments: Strategy Maps of Smithson Stores' Strategic Business Units *

Panel B: Strategic Objectives of The Women's Store (WS)



* The case materials are adapted from Banker et al. (2004).

APPENDIX 1 (continued)

Experimental Instruments: Balanced Scorecard of Smithson Stores' Strategic Business Units*

Panel A: The Women's Store (Mature Stage)

(1) Financial measures:	Weights (%)	Targets
① Sales margins	30	60%
② Sales growth per store	10	15%
(2) Customer measures:		
① Customer satisfaction rating	15	80%
② Sales per square foot of retail space	5	\$30,000
(3) Internal process measures:		
① Brand recognition rating	15	80%
② "Mystery Shopper" audit rating	10	85%
(4) Learning and Growth measures:		
① Employee satisfaction	10	80%
② Hours of training invested in manager per year	5	80 hours

Panel B: The Family Store (Growth Stage)

(1) Financial measures:	Weights (%)	Targets
① Sales margins	30	45%
② Percentage of sales from new stores	10	60%
(2) Customer measures:		
① Customer satisfaction rating	15	70%
② Percentage of sales to new customers	5	5%
(3) Internal process measures:		
① Market share per advertising dollar	15	5%
② "Mystery Shopper" audit rating	10	85%
(4) Learning and Growth measures:		
① Employee satisfaction	10	75%
② Retail experience of marketing managers	5	8 years

*The case materials are adapted from Banker et al. (2004).

APPENDIX 2
Business Life-cycle Manipulation for the Mature-Stage SBU (the Women's Store)^a

Effort level choices	1	2	3	4	5
Effort costs	(\$12,500)	(\$16,250)	(\$20,000)	(\$22,500)	(\$25,000)

Performance Measures	Target^b	Weight^c	Ranges of Possible Realizations for Each Performance Measure				
(1) Financial:							
① Sales margin	60%	30%	[30%, 65%]	[35%, 70%]	[40%, 75%]	[45%, 80%]	[50%, 85%]
② Sales growth per store	15%	10%	[3%, 18%]	[6%, 21%]	[8%, 23%]	[10%, 25%]	[12%, 27%]
(2) Customer:							
① Customer satisfaction rating	80%	15%	[49%, 84%]	[53%, 88%]	[57%, 92%]	[61%, 96%]	[65%, 100%]
② Sales per square foot of retail space (\$)	30,000	5%	[10,000, 33,000]	[14,000, 37,000]	[18,000, 41,000]	[22,000, 45,000]	[26,000, 49,000]
(3) Internal process:							
① Brand recognition rating	80%	10%	[49%, 84%]	[53%, 88%]	[57%, 92%]	[61%, 96%]	[65%, 100%]
② "Mystery shopper" audit rating	85%	10%	[53%, 88%]	[56%, 91%]	[59%, 94%]	[62%, 97%]	[65%, 100%]
(4) Learning and growth:							
① Employee satisfaction	80%	12%	[49%, 84%]	[53%, 88%]	[57%, 92%]	[61%, 96%]	[65%, 100%]
② Hours of training brand managers	80	8%	[50, 85]	[55, 90]	[60, 95]	[65, 100]	[70, 105]

^a The strategy-linked performance measures shown in this table are adapted from Banker et al. (2004).

^b The targets are adapted from Banker et al. (2004).

^c The bonus weight allocations are based on Niven (2002, Chapter 10).

APPENDIX 2 (continued)
Business Life-cycle Manipulation for the Growth-Stage SBU (The Family Store)^a

Effort level choices			1	2	3	4	5
Effort costs			(\$15,000)	(\$19,000)	(\$23,000)	(\$25,750)	(\$28,500)
Performance Measures	Target^b	Weight^c	Ranges of Possible Realizations for Each Performance Measure				
(1) Financial:							
① Sales margin	45%	30%	[5%, 50%]	[10%, 55%]	[15%, 60%]	[20%, 65%]	[25%, 70%]
② Percentage of sales from new stores	60%	10%	[20%, 65%]	[25%, 70%]	[30%, 75%]	[35%, 80%]	[40%, 85%]
(2) Customer:							
① Customer satisfaction rating	70%	15%	[30%, 75%]	[53%, 88%]	[57%, 92%]	[61%, 96%]	[65%, 100%]
② Percentage of sales from new customers	5%	5%	[0%, 6%]	[1%, 7%]	[2%, 8%]	[3%, 9%]	[4%, 10%]
(3) Internal process:							
① Market share per advertising dollar	5%	10%	[0%, 6%]	[1%, 7%]	[2%, 8%]	[3%, 9%]	[4%, 10%]
② "Mystery shopper" audit rating	85%	10%	[43%, 88%]	[46%, 91%]	[49%, 94%]	[52%, 97%]	[55%, 100%]
(4) Learning and growth:							
① Employee satisfaction	75%	12%	[35%, 80%]	[40%, 85%]	[45%, 90%]	[50%, 95%]	[55%, 100%]
② Retail experience of marketing managers	8 years	8%	[2, 10]	[3, 11]	[4, 12]	[5, 13]	[6, 14]

^a The strategy-linked performance measures shown in this table are adapted from Banker et al. (2004).

^b The targets are adapted from Banker et al. (2004).

^c The bonus weight allocations are based on Niven (2002, Chapter 10).

APPENDIX 3
Determination of Overall Performance Score (OPS) using the Balanced Scorecard

Step 1: Define the Color Rating to Denote the Level of Performance

GREEN	=	Outstanding (exceeds targets)
YELLOW	=	Very good (meets or exceeds targets)
WHITE	=	Satisfactory (close to targets)
RED	=	Poor (fails to meet targets)

Step 2: Establish Quantitative Thresholds for Each Color Rating

GREEN	=	BSC measure realization $\geq 1.1 \times$ Target
YELLOW	=	Target \leq BSC measure realization $< 1.1 \times$ Target
WHITE	=	$0.75 \times$ Target \leq BSC measure realization $<$ Target
RED	=	BSC measure realization $< 0.75 \times$ Target

Step 3: Assign Performance Score to Each Color Rating

GREEN	=	1.0
YELLOW	=	0.7
WHITE	=	0.4
RED	=	0

Step 4: Calculate the Overall Performance Score

The SBU manager's overall performance score is computed by multiplying the performance score of each BSC measure by its corresponding weight. That is,

$$\text{Overall Performance Score (OPS)} = \sum_{i=1}^8 (\text{Performance Score}_i) \times (\text{Measure Weight}_i)$$

APPENDIX 4
Performance-Weighted (PW) Incentive Contract Using WS as an Example
Manager's Payoff = $a + b \times$ (bonus pool)

Panel A: The Fixed Salary

$$a = 10,000 \text{ EDs}$$

Panel B: Determination of Bonus Rate $b = \text{OPS}^*$

	Target (A)	Actual (B)	Weight (C)	Realization relative to target (D) = [(B)/(A)] \times 100	Color Ranking	Performance Score (E)	Bonus Rate b (C) \times (E)
(1) Financial Measures:							
① Sales margin	60%	80%	30%	133.33%	GREEN	1	0.300
② Sales growth per store	15%	13%	10%	86.67%	WHITE	0.4	0.040
(2) Customer measures:							
① Customer satisfaction rating	80%	84%	15%	105%	YELLOW	0.7	0.105
② Sales per square foot of space	\$30,000	\$18,000	5%	60%	RED	0	0.000
(3) Internal process measures:							
① Brand recognition rating	80%	73%	15%	91.25%	WHITE	0.4	0.060
② "Mystery shopper" audit rating	85%	85%	10%	100%	YELLOW	0.7	0.070
(4) Learning and growth measures:							
① Employee satisfaction	80%	90%	10%	112.5%	GREEN	1	0.100
② Hours of training brand manager	80 hrs	68 hrs	5%	85%	WHITE	0.4	<u>0.020</u>
Bonus rate b earned by the WS manager							<u>0.695</u>

* See Table 1 and Appendix 2.

APPENDIX 5
Performance-Rating (PR) Incentive Contract Using WS as an Example
Manager's Payoff = $a + b \times$ (bonus pool)

Panel A: The Fixed Salary

$$a = 10,000 \text{ EDs}$$

Panel B: Calculate OPS*

	Target (A)	Actual (B)	Weight (C)	Realization relative to target (D) = [(B)/(A)] \times 100	Color Ranking	Performance Score (E)	Bonus Rate b (C) \times (E)
(1) Financial Measures:							
① Sales margin	60%	80%	30%	133.33%	GREEN	1	0.300
② Sales growth per store	15%	13%	10%	86.67%	WHITE	0.4	0.040
(2) Customer measures:							
① Customer satisfaction rating	80%	84%	15%	105%	YELLOW	0.7	0.105
② Sales per square foot of space	\$30,000	\$18,000	5%	60%	RED	0	0.000
(3) Internal process measures:							
① Brand recognition rating	80%	73%	15%	91.25%	WHITE	0.4	0.060
② "Mystery shopper" audit rating	85%	85%	10%	100%	YELLOW	0.7	0.070
(4) Learning and growth measures:							
① Employee satisfaction	80%	90%	10%	112.5%	GREEN	1	0.100
② Hours of training brand manager	80 hrs	68 hrs	5%	85%	WHITE	0.4	<u>0.020</u>
OPS earned by the WS manager							<u>0.695</u>

*See Table 1 and Appendix 2.

APPENDIX 5 (continued)
Performance-Rating (PR) Incentive Contract Using WS as an Example
Manager's Payoff = $a + b \times (\text{bonus pool})$

Panel C: Performance Rating Categories and Corresponding Bonus Rate b

Performance is Outstanding (**OS**) if $\text{OPS} \geq 0.80 \rightarrow b = \mathbf{0.90}$

Performance is at Stretched Target (**ST**) if $0.70 \leq \text{OPS} < 0.80 \rightarrow b = \mathbf{0.70}$

Performance is Acceptable (**A**) if $0.60 \leq \text{OPS} < 0.70 \rightarrow b = \mathbf{0.50}$

Performance is Average (**AV**) if $0.50 \leq \text{OPS} < 0.60 \rightarrow b = \mathbf{0.30}$

Performance is Unacceptable (**U**) if $\text{OPS} < 0.50 \rightarrow b = \mathbf{0.10}$

Panel D: Determination of Bonus Rate b

In the example the WS manager's OPS is 0.695; thus, his/her overall performance rating (OPS) is Acceptable (A) and the manager's bonus rate is **0.50**.

APPENDIX 6
Threshold (T) Incentive Contract Using WS as an Example
Manager's Payoff = $a + b \times$ (bonus pool)

Panel A: The Fixed Salary

$$a = 10,000 \text{ EDs}$$

Panel B: Determination of Bonus Rate b

	Target (A)	Actual (B)	Weight (C)	Actual meets or exceeds target?	Bonus Rate b
(1) Financial Measures:					
① Sales margin	60%	80%	30%	Yes	0.30
② Sales growth per store	15%	13%	10%	No	0.00
(2) Customer measures:					
① Customer satisfaction rating	80%	84%	15%	Yes	0.15
② Sales per square foot of space	\$30,000	\$18,000	5%	No	0.00
(3) Internal process measures:					
① Brand recognition rating	80%	73%	15%	No	0.00
② "Mystery shopper" audit rating	85%	85%	10%	Yes	0.10
(4) Learning and growth measures:					
① Employee satisfaction	80%	90%	10%	Yes	0.10
② Hours of training brand manager	80 hrs	68 hrs	5%	No	<u>0.00</u>
Bonus rate b earned by the WS manager					<u>0.65</u>

APPENDIX 7
Subjective (S) Incentive Contract
Manager's Payoff = $a + b \times (\text{bonus pool})$

Panel A: The Fixed Salary

$$a = 10,000 \text{ EDs}$$

Panel B: Determination of Bonus Rate b (the algorithm is coded into the computer program but not provided to the participants.)

Following Ittner, Larcker, and Meyer (2003), subjectivity in the scorecard bonus plan allows the superior to: (a) reduce the “balance” in bonus awards by placing most of the weights on financial measures; (b) incorporate factors other than the scorecard measures in performance evaluation; and (c) change the evaluation criteria from time to time. To incorporate these salient features, we modify the performance-weighted (PW) contract using the following algorithm to calculate the subjective weights:

Step 1: Place most of the weight on the two financial measures. The weights are higher when *both* the actual realizations are higher than the targets, as follows:

- (a) If, for **both** financial measures, **Actual > Target**, then the weights for the sales margins and sales growth per store are set at 60% and 20%, respectively (therefore the total weight for the financial measures is 80%).
- (b) If for at least one of the two financial measures, **Actual < Target**, then the weights for the sales margins and sales growth per store are set at 50% and 20%, respectively (therefore the total weight for the financial measures is 70%).

Step 2: Include one non-balanced scorecard factor, the relative performance ranking of the two SBUs (based on their OPS), into the calculation of managers' bonus with a weight of 5%. If an SBU ranks first (second), then 0.05 (zero) is added to the manager's bonus rate.

Step 3: Program the computer such that it randomly chooses two out of the three non-financial perspectives (i.e., customer, internal process, and learning and growth) into the calculation of SBU managers' bonus in each experimental period.

If the actual financial measure numbers are greater (or smaller) than the target numbers, then the total weights assigned to any two of the other three non-financial perspectives are changed to 10% and 5% (or 15% and 10%), respectively.

APPENDIX 7 (continued)
Subjective (S) Balanced Scorecard Incentive Contract Using WS as an Example
Manager's Payoff = $a + b \times$ (bonus pool)

Panel C: Subjectively-Determined Bonus Rate b

	Target (A)	Weight (B)	Actual (C)	Realization relative to target (D) = [(C)/(A)] \times 100	Color Ranking	Performance Score (E)	Bonus Rate b (B) \times (E)
(1) Financial Measures:							
① Sales margin	60%	50%	80%	133.33%	GREEN	1	0.500
② Sales growth per store	15%	20%	13%	86.67%	WHITE	0.4	0.080
(2) Customer measures:							
① Customer satisfaction rating	80%	7%	84%	105%	YELLOW	0.7	0.049
② Sales per square foot of space	\$30,000	3%	\$18,000	60%	RED	0	0.000
(3) Internal process measures:							
① Brand recognition rating	80%	10%	73%	91.25%	WHITE	0.4	0.040
② "Mystery shopper" audit rating	85%	5%	85%	100%	YELLOW	0.7	0.035
(4) Relative OPS Ranking	1	5%	1	N/A	N/A	N/A	0.050
Bonus rate b earned by the WS manager							<u>0.754</u>

a The subjective incentive contract always includes the financial perspective. The computer program selects randomly two out of the three non-financial perspectives (i.e., customer, internal processes, and learning and growth).

APPENDIX 8

Simple-Linear (SL) Incentive Contract Using WS as an Example, and Comparison of Manager's Payoff Across the Five Incentive Contracts

$$\text{Manager's Payoff} = a + b \times (\text{bonus pool})$$

Panel A: Fixed Salary

$$a = 10,000 \text{ EDs}$$

Panel B: (Fixed) Bonus Rate b

$$b = 0.733$$

Panel C: Comparison of Manager's Bonus Rate b Among the Five Incentive Contracts

Incentive Contract	Bonus rate b
Performance-Weighted (PW)	0.695
Performance-Rating (PR)	0.500
Threshold (T)	0.650
Subjective (S)	0.754
Simple-Linear (SL)	0.733