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Hoping for A to Z while rewarding only A: Complex organizations and multiple goals[1]

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Hoping for A to Z while rewarding only A: Complex organizations and multiple goals

Abstract

This paper explores the trade-offs inherent in the pursuit and fulfillment of multiple performance goals in complex organizations. We examine two related research questions: (1) What are the organizational implications of pursuing multiple performance goals? (2) Are local and myopic (as opposed to global) goal prioritization strategies effective in dealing with multiple goals? We employ a series of computational experiments to examine these questions. Our results from these experiments both formalize the intuition behind existing wisdom and provide new insights. We show that imposing a multitude of weakly correlated performance measures on even simple organizations (i.e., an organization comprised of independent employees) leads to a performance freeze in that actors are not able to identify choices that enhance organizational performance across the full array of goals. This problem increases as the degree of interdependence of organizational action increases. We also find that goal myopia, spatial differentiation of performance goals, and temporal differentiation of performance goals help rescue organizations from this status quo trap. In addition to highlighting a new class of organizational problems, we argue that in a world of boundedly rational actors, incomplete guides to action in the sense of providing only a subset of underlying goals prove more effective at directing and coordinating behavior than more complete representations of underlying objectives. Management, in the form of the articulation of a subset of goals, provides a degree of clarity and focus in a complex world.

Keywords:- Multiple performance goals; complex organizations

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1. Introduction

Much of organization theory, both classic and contemporary, explicitly recognizes the reality that organizational members have widely divergent interests and preferences (Scott 1998). Given this recognition, classical theories have focused on instruments of organization design such as authority/hierarchy (Simon 1957a), incentives (Barnard 1938; Cyert and March 1963), and organization structures (Lawrence and Lorsch 1967; Thompson 1967) that may be employed to minimize or resolve conflicts that such divergent interests engender in organizational life. In this paper, we are interested in one form of goal conflict that remains relatively understudied in the organizations literature – the conflicts that emanate from the pursuit of multiple performance goals. In a recent paper on this issue, Michael C. Jensen argued that:

> "It is logically impossible to maximize in more than one dimension at the same time unless dimensions are what are known as monotonic transformations of one another. Thus, telling a manager to maximize current profits, market share, future growth in profits, and anything else one pleases will leave that manager with no way to make a reasoned decision. The result will be confusion and a lack of purpose that will handicap the firm in its competition for survival" (Jensen 2001: 11-12).

In contrast, reviewing the empirical reality, Meyer (2002: 7) suggests that:

> "Firms are swamped with measures…it is commonplace for firms to have fifty to sixty top-level measures, both financial and non-financial…includes 20 financial measures, 22 customer measures, 16 measures of internal process, nineteen measures of renewal and development…Many firms have struggled unsuccessfully to drive measures of shareholder value from the top to the bottom of the organization" (Meyer 2002: 7).

Juxtaposing Jensen's (2001) argument with Meyer's (2002) description raises an interesting and important puzzle that provides the primary motivation for this paper. On the one hand, Jensen suggests that imposing multiple goals on managers condemns them to "confusion and a lack of purpose." On the other hand, Meyer's description suggests that multiple goals are the predominant reality of organizational life. In an attempt at reconciling the two views, we pose two research questions: (1) What are the organizational implications of pursuing multiple goals? (2) Are local and myopic (as opposed to global) goal prioritization strategies effective in dealing with multiple goals? This helps address the question of whether managers are condemned to confusion and lack of purpose when faced with multiple goals.

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The issue of multiple performance goals is intimately tied to the design of incentives and compensation. The agency theory literature has been at the vanguard of research efforts to develop a better understanding of the relationship between performance and incentives. Much of the agency view, within the principal-agent framework, has been preoccupied with the implications of *uncertainty* in observing the actions and capabilities of the agent (i.e., adverse selection and moral hazard) and *goal conflict* between the principal and the agent (Levinthal 1988; Jacobides and Croson 2001). Thus, agency problems emanate from goal conflict or the divergence in the interests of organizational members coupled with uncertainty. Similarly, behavioral theories of decision making (Cyert and March 1963) and studies of employee identification with the organization (see Dutton et al. 1994 and the references cited here) deal with problems of heterogeneous preferences and how organizations may cope with them. In a related vein, the team theory literature has explored the relationship between performance and organization structures (Marschak and Radner 1972). Team theory assumes that decision makers' preferences are perfectly aligned but diverge in the information available to them (due to heterogeneous knowledge, communication costs, or bounded rationality) and explores the optimal allocation of decision rights in different parts of the organization.

The managerial challenges of pursuing multiple goals, however, are distinct from the problems of heterogeneous preferences or information sets. For instance, organizations often pursue multiple, weakly correlated goals such as increasing market share, improving profitability, realizing sales growth, improving customer satisfaction, reducing costs, or improving quality (Meyer 2002). While it is possible that these intermediate goals help attain the overall goal of profit maximization, the empirical reality is that these goals are often negatively correlated (Meyer 2002). Even if all organizational members had homogeneous preferences about maximizing firm profits, the challenge of multiple goals still remains undiminished. Whereas goal conflict in agency theory is fundamentally about the divergence in the interests of the principal and the agent, the multiple goals described in this paper refer to conflicts that weakly correlated goals create for even a single individual. In addition, the problem of multiple goals exists even if decision makers had identical information, thus setting it apart from the concerns of team theory. The important implication is that the conflict from multiple performance goals can create

significant managerial challenges even when there is perfect alignment of preferences and information sets. Thus, the coordination challenge of multiple performance goals is independent of and distinct from the typical agency or team theory problems (and their solutions).

Kerr (1975), in an early recognition of the problem of multiple goals, explored the question of incentive design when performance goals are measured imperfectly. His main insight was to show that imperfections in measurement will lead to individual effort distortion even in the absence of divergent interests between employees. The research that radiated from Kerr's work is largely within the economics and accounting literatures. In particular, a research theme within the economics literature has focused on the design of optimal incentives and contracts when there are multiple performance goals (Hölmstrom and Milgrom 1991; Baker 1992). A significant body of work in accounting has directed attention at the measurement problem (Datar et al. 2001). Accounting innovations such as the Balanced Scorecard and Activity Based Costing were based on the recognition that organizations could rarely be reduced to evaluating them on unitary performance measures (Cooper and Kaplan 1992; Kaplan and Norton 2001). The implicit assumption behind these models was that the primary constraint on effective performance evaluation was the development of fine grained performance measures that can guide and reward effort. Once the measurement problem was solved, performance problems should largely disappear.

The issue of multiple goals is intimately tied to an important, but somewhat underappreciated, foundation of Simon's notion of bounded rationality (Simon 1955). An enormous array of scholars have built upon Simon's ideas and based their work on the theoretical premise that actors do not optimize over a known set of alternatives, but rather search sequentially through a pool of alternatives until an aspiration level of a satisficing outcome is obtained. However, Simon's original conception of bounded rationality incorporated the notion of independent and potentially conflicting constraints. Satisficing is not with respect to some scalar value along a single dimension of performance, but rather reflects the satisfaction of a number of distinct constraints. A critical feature for our present purposes is the assumption that actors are not able to make compensatory trade-offs among these distinct goals. As discussed in the subsequent section, this element of Simon's argument has been validated by a large set of studies in psychology and behavioral economics.

We employ a formal computational model to address the two research questions posed earlier. A formal model, while clearly an abstraction that captures at best only a small slice of reality, allows us to focus sharply on the managerial choices we are interested in and explore the relationships among them. The range of organizational choices we simultaneously examine – diversity of goals and interdependencies among them, task interdependence, alternative goal prioritization strategies, and alternative organization structures – makes a closed-form solution analytically intractable. Analytical tractability comes at a cost of extensive simplification such as exploring only complementarities among decisions (Milgrom and Roberts 1995), optimal resource allocation with problem decomposition (Baumol and Fabian 1964), or comparing the value of full information with local information in team decision making (Arrow and Radner 1979). We are interested in examining a broader range of managerial choices than analytical tractability would permit. In recent years, a number of papers have employed similar models to explore questions of imitation (Rivkin 2000), modularity (Ethiraj and Levinthal 2004b), organizational design (Rivkin and Siggelkow 2003), and persistent profitability differences (Lenox et al. 2006). The one element common to all these papers is the presumption of interdependencies between various firm/managerial decisions.

We start with a simple model to first highlight the problem of multiple goals and then progressively add elements that reflect the reality of organizational decision making. First, we consider a setting in which there are no interdependencies between individuals in an organization, but each individual faces multiple weakly correlated goals. Subsequently, we incorporate decision interdependence in the organization and explore the efficacy of three local and myopic strategies for dealing with multiple goals: (1) goal myopia – focus on a single goal to guide managerial action, (2) spatial differentiation – each department is given different performance goals, and (3) temporal differentiation – focus on a single goal, but allow this goal to vary over time.

The main contribution of this paper is twofold. The first contribution is the identification of a distinct class of organizational problems that emanate from the recognition that multiple goals can exist even when preferences of organizational members are not divergent, i.e., they cannot be reduced to derivates of agency problems. We argue that multiple goals stem from a confluence of two factors. One,

every action of organizational members cannot fully be reduced to a global goal which necessitates the deployment and use of intermediate and subunit goals. Two, if every managerial action affects multiple goals (some positively and others negatively), it creates correlations among the goals that complicate decision making.

The second contribution is in showing that when managers are assumed to be boundedly rational – they cannot integrate across a diverse set of goals – imposing multiple goals leads to a freezing in behavior towards the status quo. A variety of strategies rooted in a common principle of providing a necessarily incomplete view of the full set of organizational goals is effective in rescuing decision makers from the status quo "freeze". Thus, we argue that boundedly rational managers are better off with limited problem representations that direct myopic attention at only a subset of goals. The benefits of such myopia at the individual level extend to the full set of goals that the organization is attempting to achieve. Thus, the role of management is to provide a necessarily incomplete view of the full set of organizational goals. This affords the focus and clarity required to foster action in boundedly rational managers.

The following section discusses the extant literature that addresses the issue of multiple goals in complex organizations.

2. Research on multiple performance goals

We briefly review the central ideas and conclusions of four literatures that address the question of multiple goals in complex organizations. The literature in organization theory that focuses on divergent interests and preferences of its members, goal-setting and organization design, multi-tasking and incentive design in economics, and performance measurement in accounting.

2.1. Divergent interests and multiple goals

An early systematic theoretical treatment of divergent interests and preferences of organizational members is found in Cyert and March (1963) who argued that individuals have their own goals and these individual goals translate into organizational goals via an aggregation process such as bargaining, coalition formation, or consensus. Through this lens, goals such as production smoothing, inventory holding, sales targets, market share, or profits are all goals shared by distinct coalitions within the

organization whose members share the same interests and preferences. The resolution of inconsistent goals across divergent coalitions occurs via decentralization of decision making (i.e., the use of organization structures to map decision makers with goals), sequential attention to goals (temporal shifting of inconsistent goals), and adjustment of organizational slack (use of side payments to reconcile divergent goals of different coalitions). Much of the literature in this vein is theoretical in nature, though a small empirical literature in accounting has examined this issue as well.

Building on this idea, Cohen et al. (1972) using a computer simulation model investigated the implications for decision making and problem solving of employing alternative decision structures such as unstructured, hierarchical, or based on specialization. They show that decision structures generate variations in the decision styles employed, the number of problems solved, the length of time a problem remains unsolved, and decision-maker activity. Much of the difference in decision structures in the model emanates from the divergent interests, preferences, and expertise of the decision makers. In a related paper, Cohen (1984) examined the implication of using global goals versus subunit goals on organizational search strategies. Using a simple linear programming model from Dantzig (1963), he showed that diversity and conflict among subunit goals resulted in increased performance. In the model, attention to maximizing the objective function corresponds to global goals, whereas attention to one or the other constraints reflected subunit goals. Once again, in this setup, attention to different constraints reflects attention to different goals of subunits that arise from their divergent interests.

Burton & Obel (1980), using a decomposition rule similar to that in Cohen (1984), compare the performance effects of M-form and U-form organizations across two different technological regimes – nearly decomposable and non-decomposable. They find that the M-form yields superior performance in comparison with the U-form and that the performance difference is greater in nearly decomposable technologies. In Burton & Obel (1988), they replace technology with incentives (corporate and division) and examine performance implications of M-form and U-form structures using a laboratory experiment. These studies focus either on a single goal (Burton and Obel 1980) or divergent goals between subunits (Burton and Obel 1988). While they provide important boundary conditions for our investigation, they do not address the problem of multiple, interdependent goals for a single individual or subunit.

More recently, Rivkin & Siggelkow (2003), using an agent-based simulation, explore the relationship between the vertical hierarchy, the incentive system, and structure of the organization to explore the tradeoff between forces that encourage broad search for solutions and the lock-in on good solutions once they are found. In this model, as in Cohen (1984) or Burton & Obel (1988), incentives may be based on overall organization performance or subunit performance.

The studies of multiple goals emanating from divergent interests of organizational members have generated rich insight into the design of organization structures and incentive systems. These models, focusing on goals emanating from divergent interests and preferences are, however, distinct from the multiple goals that organizations pursue, such as market share, profitability, and customer satisfaction. Such multiple goals would exist even if we were to perfectly align the interests and preferences of all organization members. Seen through the lens of Cohen's (1984) model, multiple goals would amount to multiple objective functions not just multiple constraints. For instance, consider a firm pursuing a single global goal of maximizing discounted stream of cash flows (DCF). Assume also that all organizational members share the same goal of maximizing DCF. Now, even if all organization members subscribe to the same goal, every action and decision of managers cannot all be mapped to their impact on DCF. For instance, a salesperson facing a decision to make a cold call or an R&D scientist deciding on synthesizing a molecular variant in drug development cannot easily reduce the implications of her actions for firm DCF. Given the impossibility of reducing every decision in the organization to its impact on DCF, organizations rely on intermediate performance goals such as cold call targets, number of molecules synthesized, or patents filed. There is the expectation that such intermediate goals ultimately square up with DCF; but, as empirical work shows, it does not always do so (Meyer 2002).

Such intermediate performance goals pose conflicts not only between different individuals facing different intermediate goals but also for a single individual facing multiple intermediate goals. For instance, the salesperson's job may be to generate new leads and also to retain existing customers. The greater the time spent pursuing new leads, the less time available for attending to existing clients. In addition, acquiring new customers and retaining existing customers may have different marginal contributions to overall firm DCF. Thus, even in the absence of divergent interests and preferences, the

challenge of multiple goals for organizational performance is significant. Such challenges are compounded when the different intermediate goals are correlated, some positive and others negative.

2.2. Multi-tasking and incentive design

The literature on multi-tasking arose as a response to the incentive design problem that Kerr (1975) highlighted. Hölmstrom and Milgrom (1991) represents the first formal effort to grapple with the problem of incentive design when there are multiple, weakly correlated performance goals to be attained and the measurement of these goals is asymmetric, i.e., some goals are more accurately measurable than others. They show that when the performance goals are positively correlated (i.e., the goals are complements), then incentive design is not a serious issue and asymmetries in the measurement of the performance goals are self-correcting. This is because increases in effort to achieve one goal will also lead to improvement on the positively correlated goals. The challenge, however, is when the multiple performance goals are uncorrelated or even weakly correlated and there are asymmetries in how accurately the goals can be measured (e.g., Flood and Scott 1987 found that widely employed measures of hospital quality showed weak and inconsistent correlations). In such cases, they show that employees will reduce effort on less measurable goals and transfer their effort to the more measurable goals. Hölmstrom and Milgrom (1991) show that reducing incentive intensity (i.e., eliminating performance-contingent incentives) is an optimal solution to this problem. A subsequent stream of empirical work arose to test this assertion (see Prendergast 1999 for a review).

Furthermore, this work offers implications for the design of tasks to solve the incentive problem. They suggest that grouping tasks based on performance measurability mitigates some of the effort-distorting effects. For instance, all tasks that are highly measurable should be grouped together and allocated to one person with high-powered incentives, and all other tasks that are less measurable should be grouped together and assigned to another person with low-powered incentives. In addition, tasks whose performance goals are negatively correlated should be separated from those tasks that are positively correlated with the groups of tasks assigned to distinct sets of employees, with high-powered incentives being offered to the latter group.

This analysis, while insightful, is troubling with respect to two implicit assumptions. First, it assumes a one-to-one correspondence between behaviors and goals, i.e., one kind of behavior affects one goal either upward or downward. This assumption is critical to their prescription of grouping tasks by measurability of goals. In reality, however, a single action can have multiple consequences, i.e., the action-goal relationship is likely a one-to-many kind. Consider, for instance, the job of an instructor teaching a case to an audience of MBA students. One choice of the instructor is the level of discussion to promote in class via behavior that encourages or discourages student contributions to the case discussions. While promoting discussion can contribute positively to pedagogical goals, such as helping students understand and grapple with a problem and generate diverse solutions, it also could have undesirable effects, such as polarizing the class or hampering the linear flow of the logic of the class and ultimately undermining the teaching goal itself. Clearly, the single action of how much discussion to promote in class has implications for several sub-goals that comprise the overall goal of education.

In addition, the assumption of one-to-one correspondence between decisions and goals does not square up with the empirical literature examining correlations among goals. For instance, Meyer and Gupta (1994), in reviewing the literature examining correlations among goals, cite studies that find correlations ranging between -.14 and -.23 between performance measures such as ROI, ROA, ROE, and total stockholder return (Jacobson 1987; Keats and Hitt 1988). Such correlations between goals can only exist when a decision in pursuit of one goal also affects another goal. If each decision affected strictly only one goal, then the correlations among goals would always be zero. Empirical evidence documenting correlations among goals suggests that decisions in pursuit of one goal often affect one or more other goals, which undercuts any prescriptions based on the assumption of one-to-one mapping between decisions and goals. The presence of such one-to-many relationships between decisions and goals is problematic for Hölmstrom & Milgrom's (1991) predictions because when a single decision can have multiple performance implications, some of which may be measurable and some not, then it is impossible to engage in the job design approach that they advocate. How does one group decisions by measurability when the decisions themselves exhibit variance in the extent to which to they contribute to different performance goals and when there is variance in the measurability of the different goals?

A second difficulty, and one shared in the accounting literature discussed in the subsequent section, is the implicit assumption that individuals can integrate across divergent goals. We can conceive of two polar extremes of how the decision maker might evaluate performance improvement across multiple outcome measures. At one extreme, it is possible to visualize a boundedly rational decision process as elaborated in Simon (1955: 108) wherein the vector of performance goals are treated as distinct goals that cannot be reduced to a single baseline or common denominator. For instance, an organization might be pursuing a restructuring effort, the goals of which might include cost reduction, speeding up decisions, reducing layers in the hierarchy, and increased accountability. Each goal is treated as distinct since they cannot be reduced to a common denominator. At another extreme lies the rational choice principle wherein the multiple goals are reduced to a scalar value (Arrow 1951). In this case, it is possible to assign a numeric value to the impact of each action on every goal, add up the impacts, and then base the decision on the aggregate impact across goals.

The evidence across a variety of social science disciplines is quite clear that the rational choice model, i.e., the scalar integration across multiple performance goals, reflects a poor match for what individuals seem to be capable of. Indeed, individuals struggle with even relatively simple mental accounting tasks, and integrating over the most fungible of assets -- money (Thaler 1985; Heath and Soll 1996; Thaler 1999). Individuals "bracket" their financial outcomes both temporally (budgets for months, years, etc.) and categories (entertainment, dinning, clothing) and treat their budgets, expenditures, unexpected gains and losses across time and categories separately. Clearly, the task of integrating across qualitatively distinct outcome categories is a vastly more challenging task. The capacity of simple linear models to best the judgment of experts is testimony to this fact (Dawes 1979). The reasons for this include the difficulty of reducing diverse goals to a common baseline that permits seamless aggregation, the difficulty that people have in distinguishing valid and invalid variables, and the development of false beliefs regarding the associations among variables (Dawes et al. 1989).

While the evidence is overwhelming that individuals find it difficult to integrate their choices across space and time, the reasons are less conclusive. Read et al. (1999), in reviewing the causes for integration difficulties, suggest four reasons – cognitive limitations (Miller 1956; Simon 1957b),

cognitive inertia or a function of how choice situations present themselves, socially acquired decision rules or heuristics (Zelizer 1989), and motivated bracketing or self-control (Ainslie and Haslam 1992). Thus, there appears to be convergent evidence that decision makers are more likely to treat performance goals as a vector of action guides rather than as a scalar dimension that collapses all performance goals.

2.3. Goal-setting and organization design

Organizational psychologists have had a long-standing interest in the implications of goal setting for employee motivation and performance (see Locke and Latham 1990 for a survey of this literature). The goal setting literature is mostly interested in the relationship between goals and task performance. Goals are typically differentiated in terms of specificity, difficulty, and intensity. A large volume of empirical research in this tradition finds that specific and difficult goals (as opposed to vague or easy goals) result in higher performance. Locke and Latham (1990: 52-54) also review the studies that assign multiple goals and find that the primary results relating goal difficulty and performance carry over to the case of multiple performance goals. While these studies recognize the prevalence of multiple goals, they model them as distinct tasks, i.e., tasks and goals share a one-to-one relationship (e.g., Schmidt et al. 1984). As we argued in the previous subsection, there is often a one-to-many relation between tasks and goals. Pursuit of a single task can affect multiple goals as in the MBA instructor example above. In work that builds closely on Burton and Obel (1988), Wageman (1995) empirically examined the relationship between task and outcome interdependence. Tasks may be accomplished by individuals or groups and rewards may be dependent on individual or group performance. She found that pure strategies (individual tasks paired with individual rewards and likewise with groups) outperformed hybrid strategies across a variety of performance measures. While this is an important study that bridges job design with incentive design and provides evidence of the tradeoff between the two, it does not study the effects of interdependencies among the goals themselves. Finally, Audia et al. (1996) examined the relationship between goals, work processes, and outcomes on a task that could be accomplished in multiple ways. Though they did not explicitly model the correlation between goals, they found that setting process goals lowered performance on outcome measures. They concluded that this was indicative of the effort

distortion effect highlighted in Kerr (1975). Collectively, these studies expose the dual challenges of designing organizations when decisions affect multiple goals and the goals themselves are interdependent.

The literature in organization design that emerged from the work of Lawrence and Lorsch (1967) is also germane to the problem of multiple goals. They argued that organization design is fundamentally a problem of designing organizations to match external environmental demands (see also Galbraith 1977). They also suggested that different parts of organizations may face different environmental contingencies which meant that each department should be tailored or designed to respond effectively to the environmental demand that it faced. The environmental demands or contingencies that each department faced corresponds to the notion of multiple goals. For instance, the production department may be subject to input uncertainties so the structure should be designed to deal with this. In contrast, the marketing department may face a fairly certain demand environment in terms of customer preferences but a competitive one, which means that it would need to compete for customers to generate growth. Thus, Lawrence and Lorsch (1967) would suggest that the production department should be given goals such as maintaining minimum input buffers, minimizing wastage, and using the futures market to hedge against input price uncertainties. In contrast, the marketing group should be given goals such as stealing market share from rivals (such as cold calls to new customers or promotions to encourage switching) and retaining existing customers (increasing customer satisfaction or pursuing service quality measures). Such a tailoring of goals to different parts of the organization will make the organization increasingly differentiated that in turn will compound the challenge of integrating these disparate goals. While this literature suggests ways that organizations might pursue multiple goals, what kinds of tradeoffs or challenges that such multiple goals present is less clearly addressed.

2.4. Performance measurement

While the multitasking literature was founded on two central pillars – that there are multiple performance goals and there is variance in how well they can be measured – a literature in accounting developed to address the measurement problem. The Balanced Scorecard (BS) approach is directed at fine-grained non-financial performance measures built around three main categories: customer, internal

business processes, and learning and growth (Kaplan and Norton 1992). Seeking to overcome the limitations of backward-looking traditional accounting measures, the Balanced Scorecard approach was designed to serve as a guide to strategy and managerial action (Kaplan and Norton 2001). Ittner and Larcker (1998), reviewing the adoption of the Balanced Scorecard, suggest that more than 70 percent of the adopters use it to define performance measures and base compensation decisions on these measures even though the pioneers caution against their use for compensation decisions (Kaplan and Norton 1996).

There is, however, one significant problem in the Balanced Scorecard approach that does little to help our understanding of how organizations should deal with multiple performance goals. The proliferation of micro-level performance measures while perhaps helping direct employee effort with better task feedback has its unintended consequences. As Meyer (2002) notes, multiple performance measures are useful only if they are measuring different things. If they were all measuring the same thing (i.e., the measures were positively correlated), then the multiple measures would simply provide a more robust estimation of a common construct. The corresponding challenge of this finding is that these divergent fine-grained measures cannot be reduced to a global, aggregate measure.

There is a paradox here. Imagine an employee given four uncorrelated or marginally negatively correlated performance goals derived from a BS. In the case of uncorrelated goals, the employee faces an effort allocation challenge of dividing her time among the goals to be pursued. The implementation challenge, however, is in the prioritization of which goals are more important and which are less. The Balanced Scorecard provides little guidance on how weights may be assigned to goals. And even if we were to solve the problem of assigning weights to the measures to help in the employee allocation problem, it could still return us full circle to the effort distortion problem (Hölmstrom and Milgrom 1991).

In sum, we find some important gaps in the extant literature on multiple goals in organizations; and, in particular, the implications of weakly correlated goals on employee behaviors are poorly understood. Also, the extant literature often makes two assumptions that are unsupported by empirical evidence: (1) one-to-one correspondence between decisions and goals, (2) that individuals can integrate across diverse goals in making decisions. In the ensuing analysis, we relax both assumptions.

3. Organizations and multiple performance goals

In this paper, we are interested in how complex organizations cope with multiple goals and the implications of alternative coping strategies. Since we qualify organizations by "complex" and performance goals with "multiple," it is imperative to contrast both qualifiers with their antitheses. The four-cell matrix in Figure 1 contrasts organizational complexity with goal multiplicity.

Multiplicity of goals can arise for two reasons. First, multiple goals may be refinements of an underlying construct such as profits. In other words, the various goals are positively correlated and together account for a common factor that is the global goal. Here, multiple goals are useful if the global goal is not directly measurable. Second, multiple goals may be necessary because they measure distinct performance goals that are uncorrelated. In this paper, we examine this more extreme case where goals are designed to be orthogonal to one another (though, ex post, they yield very small correlations that are symmetric around zero).

The simple-complex dimension is defined on a continuum which is a function of interdependencies among decisions or actions. Interdependencies between decisions introduce non-linearities in the performance functions that individuals face. Consider, for instance, an organization allocating R&D personnel between two types of product development activities: new product development and incremental refinement of the existing product. Even though, for all practical purposes, the two sets of employees can work autonomously, the decisions of one are likely to affect the outcomes of the other. Major innovations in the architecture of the product can render obsolete incremental refinements to the existing product. Similarly, a new architecture might make it impossible to incorporate important incremental refinements. Thus, even if the organization is trying to maximize a single, global product development performance measure, interdependencies among various decisions can create a non-linear performance function that can complicate performance improvement efforts. As might be expected, an increase in interdependencies among decisions impedes the reliable mapping of cause-effect relations, i.e., which decision caused the change in performance.

Drawing on this discussion, we propose a limited, working definition of complex organizations: organizations characterized by interdependencies among decisions that affects the mapping of cause-

effect relations between decisions and outcomes.[2] Conversely, a simple organization is one characterized by no interdependencies between organizational decisions. Every decision is independent of and unrelated to other decisions. In this paper, we are primarily interested in quadrants II and IV in Figure 1. We first outline the performance challenge in simple organizations with multiple performance goals to explicate the underlying mechanisms. In the remainder of the paper, we model complex organizations and examine the performance effects of alternative strategies and structures in organizations pursuing multiple goals.

3.1. Simple organizations and multiple performance goals

For simplicity, consider a simple organization of sales representatives. Each representative is allotted a non-overlapping geographic territory in which she seeks business. Thus, the performance of one salesperson is unrelated to the efforts of other salespersons. Assume that each salesperson has a number of goals including sales growth, customer retention, identifying sources of customer dissatisfaction with the product, understanding advantages of competitors' products, feeding back ideas from customers on how to improve the product, generating leads for new product launches and so on. Though unrealistic, assume also that the salesperson's decisions in the pursuit of these goals are all unrelated to one another. In this simple structure, if we impose the condition that each decision the salesperson makes has an impact on one and only one performance goal then multiple performance goals pose only the challenge of the salesperson dividing her time to pursue the goals. If, however, each action has implications for two or more performance goals and if the goals themselves are sometimes positively correlated, sometimes unrelated, and negatively related at other times, then coordinated action becomes a challenge.

Consider, for instance, the salesperson exploring a new sales lead. The customer has a clear set of needs that is mostly met with the existing product. But a new product to be launched in about six months better meets the customer's needs. Should the salesperson push the existing product and risk post-purchase customer dissatisfaction or get her to wait for the new product. What if the customer defects to a competitor's product? This stylized illustration highlights how a single action can affect multiple goals

[2] The organization theory literature typically equates complexity with diversity or variety (see Scott and Davis 2007: 126) and treats interdependence as a distinct dimension. We follow Simon (1962) in seeing complexity as a function of interdependencies among choices. This is also consistent with other definitions of complexity (Adami 2002).

and in turn create correlations among goals. Dealing with such problems is straightforward if the goals themselves are commensurable, i.e., the action can be evaluated for its impact on all possible goals and the net impact can be reduced to a scalar value that can guide the go or no-go decision. Unfortunately, as discussed in the last section, a large swath of work in social science suggests that such compensatory evaluation is rarely possible in practice. Thus, even in simple organizations with one individual having no interdependencies with others, as one action has implications for multiple performance goals and achieving one goal starts undermining another, the coordination problem starts to become real and trade-offs inevitable.

3.2. Complex organizations and multiple performance goals

Extending the sales organization example, allowing interdependencies between salespersons makes the organization complex. For instance, division of labor is not by geography but rather by product. Each salesperson may be responsible for one family of products and it is possible that two or more salespersons from the same organization may pursue the customer for different products (e.g., as is common in pharmaceutical detailing). When the actions of two or more salespersons are interdependent, some actions may be positively reinforcing (e.g., a product salesman making a sale will help a service salesman obtain a maintenance contract), others may be negatively reinforcing (e.g., a car salesman pushing a car with factory-installed options will undermine the efforts of a salesman pushing equivalent aftermarket options) or unrelated. Assume, in addition, that they face the same set of performance goals. This affords the observation of two distinct and independent coordination challenges: (1) the decisions of the salespersons are related, but not always in the same direction, and (2) each decision may be related to multiple performance goals as in the simple organization example above.

If multiple goals complicate coordination in even simple organizations, it is intuitive that the challenges will be amplified in complex organizations. This is because even if two performance goals are positively correlated or uncorrelated in a single decision, if a single decision by one salesperson (e.g., building a customer list that may be early adopters in preparation for a new product launch) is undermined by a decision of a different salesperson (e.g., pushing an existing product from a different

product line that uses up the budget of the customer), then the effort of the former salesperson is frustrated. For performance improvement to occur, two conditions have to be met: The decisions of the two salespersons have to be positively reinforcing and the goals that the decisions map onto have to be either positively correlated or unrelated. The interdependence in their decisions greatly exacerbates the challenge that an initiative by one actor will enhance performance across the multiple dimensions of performance outcomes. Not only might goals be at cross-purposes (i.e., negatively correlated) but decisions across individuals may be as well.

Thus far, we argued that multiple goals in simple and complex organizations are likely to present significant coordination challenges, particularly if we assume a one-to-many relationship between decisions and goals. In the following sub-section, we draw on the existing literature to propose three alternative local and myopic strategies to understand how they affect the pursuit of multiple goals. Our principal effort is to understand the limits of Jensen's (2001) assertion that a single, global goal is the only way to achieve coordinated, managerial action.

3.3. Strategies for coping with multiple performance goals

Organizations constantly grapple with multiple performance goals without necessarily being condemned to confusion and lack of purpose. What kinds of strategies do (or might) organizations employ? First, we explore a myopic strategy wherein firms pursue just a subset of the goals. Second, we explore the spatial separation of performance goals, i.e., each department is given only one (or a subset) of the performance goals to pursue. Finally, we explore a third alternative: the temporal separation of performance goals, i.e., the organization pursues only a single performance goal at any point in time and this goal is varied with some periodicity (Cyert and March 1963).

There is some precedent in the literature to the pursuit of myopic goals. Cohen (1984) showed that managers pursuing subunit goals exhibited superior performance when compared with managers pursuing global goals. The primary explanation for this counterintuitive result is the introduction of uncertainty or noise into the choice process. Whereas subunit incentives generated alternatives with greater dispersion, global incentives produced alternatives spanning a narrower range of performance

outcomes. The introduction of noise reduced the average performance of the global incentive regime to a greater extent than the average performance of the subunit incentive regime. The higher variance of outcomes in the subunit incentive regime compensated for the errors in choice. The interesting question is why local incentives generated greater variance. The answer it turns out depends on the number of inconsistent preferences that are incorporated into the alternative generation process. The greater the number of distinct preferences that enter the decision calculus, the fewer the alternatives that meet all the divergent interests. In the case of subunit incentives, a smaller subset of preferences determines the choice of alternatives, which yields a greater number of alternatives for evaluation. Thus, dispersion in the performance implications of the choice alternatives is simply a function of the number of alternatives. Employing this same intuition, but without the assumption of inconsistent preferences, we propose to examine the implications of myopic goal prioritization in the face of multiple goals.

Second, consistent with Hölmstrom and Milgrom (1991), a spatial separation of performance goals is perhaps a useful strategy to deal with multiple goals. Since the main challenge of pursuing multiple performance goals is the frustration associated with conflicts between goals, we propose that each department is given only a subset of the overall goals of the organization. For instance, an organization may be pursuing three weakly correlated goals: sales growth, manufacturing cost reduction, and customer satisfaction. Each of the three departments is given only one of the goals to pursue. Ex post, however, the overall organization is still evaluated on all three goals. The idea of spatial differentiation has been around in organization theory for several decades. Lawrence and Lorsch (1967) suggested that departmentalization of the organization is necessary to cope with varying degrees of environmental uncertainty. Based on an empirical study of several firms across a variety of industries, they identified goal orientation as an important basis for differentiation. Later treatments of organization design (Galbraith 1977; Mintzberg 1979) explicitly advanced the proposition that objectives may be spatially separated within the organization. This general principle was reinforced in the accounting literature under the rubric of responsibility accounting (McNair and Carr 1994). Thus, there is considerable empirical evidence that spatial differentiation of goals is employed in practice. How spatial differentiation affects the pursuit of multiple goals and the conditions under which it is effective remains largely unexplored.

The last strategy that we propose for dealing with multiple performance goals is the temporal separation of performance goals (Cyert and March 1963). For instance, an organization might set the single goal of cost reduction for the entire organization, pursue it for say three years and then shift the entire organization to the performance goal of improving quality for the next three years, and so on. The organization is still evaluated on all the performance goals. Only the managers are myopic in pursuing just one of these goals at any moment in time. A striking example of temporal separation of goals appears in the case of Komatsu, an earth moving equipment manufacturing company based in Japan. Evidence of temporal differentiation of goals appears in the management philosophy of its CEO, Ryoichi Kawai, termed "management by policy" (Bartlett 1989). This philosophy involved… "the basic policy and value of the target must be clarified so that all the staff members can fully understand what the company is aiming for in a specific time period" (Bartlett 1989: 11). Consistent with this approach, Kawai single-mindedly pursued quality improvement in the early 1960s to make Komatsu competitive with Caterpillar. In the second phase during 1965-70, he pursued cost reduction. In the 1970s, he shifted the company goal to aggressive international expansion. In the late 1970s, the focus shifted back to aggressive cost reduction in an effort to improve the competitiveness of the company's product in the face of a global slowdown. Finally, in the early 1980s the company shifted its goal to product line expansion.

3.4. Structures to deal with multiple goals

Organization structures are central to coordinated action. As Chandler (1962) argued in his seminal work, the rise of the M-form organization was instrumental to large increases in the sizes of business firms. The M-form was well suited to exploit economies of scope (as opposed to economies of scale) across related businesses while simultaneously allowing each business to engage in relatively unfettered decision making. At the heart of his theory were the different performance goals that each business faced, which contradicted with the functional form of organization that imposed uniform performance goals. Freeing up individual businesses to diverge in their goal prioritization allowed large increases in firm size without the concomitant coordination costs. The tradeoff here is between the gains to coordination between the various businesses weighed against gains from the pursuit of different

strategies across the businesses. The extent of interdependencies between the different businesses mediates this tradeoff. With increases in interdependence across businesses, the downsides of lost coordination become salient and increase the benefits of the functional organization. In contrast, with lower interdependencies between businesses, the benefits of pursuing divergent goals specific to the business become salient and thus increase the benefits of the M-form organization. For simplicity, we explore only one type of structure: a loosely coupled structure (or an M-form structure) with minimal interdependencies between departments.[3]

The following section describes the modeling structure employed to investigate the organizational implications of multiple goals and the effect of alternative goal prioritization strategies and structures.

4. Model

We set up a computational model to examine the implications of multiple performance goals in simple and complex organizations. We chose to adapt the NK-model (Kauffman 1993) rather than build a simulation model from the ground up. This choice was motivated by three reasons. First, the modeling of interdependencies among decisions and goals is critical to the focus of this paper. The NK-model is explicitly designed to explore the implications of interdependencies among discrete choices (genes in the biological literature). We only needed to adapt it to add interdependencies among goals. Second, the NK-model has well explored and established asymptotic properties (Altenberg 1997) developed over the last decade of research in both natural (Perelson and Macken 1995) and physical sciences (Stadler 2002). This increases confidence in the properties of the simulation platform and helps distinguish between results that are a product of the simulation model itself and the variables that are modeled. Third, the NK-model has been widely used in the management literature as well (Levinthal 1997; Rivkin 2000; Rivkin and Siggelkow 2003; Ethiraj and Levinthal 2004a; Lenox et al. 2006). This provides a growing cumulative body of work that facilitates comparison of results across papers and increases confidence in the results.

[3] Our results our qualitatively similar even in tightly coupled structures (i.e., functional structures). We don't present these results to reduce the number of parameters that we vary so as to focus the reader's attention on the core problem of multiple goals.

The model set-up for examining the implications of multiple performance goals on organizations requires the specification of four features of the experiment: (1) the representation of the firm and how the performance goals are generated; (2) the adaptive efforts of organizational members to improve performance; (3) the setup for goal myopia, and spatial and temporal differentiation respectively of performance goals; and (4) the modeling of the structures of complex organizations.

4.1. The firm and its performance function

A firm, f, is represented as a row vector of N decisions, $f=\{d_1...d_N\}$ with G performance goals, $G=\{p_1...p_G\}$. Each decision can take on one of two possible values (0, 1).[4] For instance, an employee facing the performance goal of boosting sales may choose to pursue cold calls or referrals from existing customers. In a "simple" organization, as characterized in the prior section, there are no interdependencies between any pair of decisions d_i and d_j. Consistent with our assumption of a one-to-many relationship between actions and outcomes, each decision d_i affects every performance goal in G.

Let the performance contribution of each decision d_i to performance goal p_g be denoted by ω_{ig}. The value of ω_{ig} is treated as an *i.i.d.* random variable drawn from the uniform distribution U(0,1) for each p_g. The contribution of each ω_i to each performance goal p_g is drawn independently. This ensures that there are no systematic correlations between the performance goals. However, since the draws are random, small correlations (both positive and negative) between the performance goals are likely. While some goals will be positively related, others may be negative or unrelated. This is again consistent with the empirical patterns observed in the literature (Meyer 2002). Thus, even in simple organizations, one decision might improve performance on one goal while undermining performance on other goals. Firm performance on each goal, Ω_g, is a simple average of ω_{ig} over the N decisions:

$$\Omega_g = \frac{1}{N}\sum_{i=1}^{N} \omega_{ig} \text{ ..... } ...(1)$$

In a complex organization, however, decisions d_i and d_j may be interdependent. For instance, the decision to make cold calls for sales may be interdependent with the decision to purchase the customer

[4] There is no loss in generality in restricting the choice to be binary if the set of possible choices is discrete. It is possible to respecify a large, but finite, discrete set of possibilities, as a set of binary decision choices.

database since the effectiveness of cold calls is partly dependent on the characteristics of customers represented in the database. Similarly, the decision to pursue referrals from existing customers may be interdependent with the incentive scheme used to generate referrals. While some combinations of decisions may yield performance improvements, others may undermine it.

This means that each performance goal of the firm could depend not just on the setting of the decision choices but also on the interactions among them. As the interactions between decision variables increase, the contribution of each decision choice to each performance goal becomes increasingly interdependent. Consequently, tweaking a decision choice that improves the performance contribution of one decision does not always lead to an increase in firm-level performance on that goal. This introduces two independent coordination challenges. First, due to the one-to-many relationship between decisions and outcomes, each decision can have unpredictable consequences for overall firm performance, Ω. Second, interdependencies between decisions can add to the unpredictability of firm performance.

Thus, extending the description of a simple organization above, the performance contribution (ω_{ig}) of each decision (d_i) is determined both by the state (0 or 1) of the i^{th} decision choice and the states of the j other decisions on which it depends:

$$\text{Let } D = \{d_j \mid j \in \{1,...,N\}\}, \text{ then } \omega_{ig} = \omega_{ig}(d_i; D_i), \text{ where } D_i \subseteq D \; \forall \; i \in \{1,...,N\}$$

The value of ω_{ig} is treated as an *i.i.d.* random variable drawn from the uniform distribution U(0,1) for each $(d_i; D_i)$. In a complex organization, firm performance on a single goal, Ω_g, is a simple average of ω_{ig} over the N decisions:

$$\Omega_g = \frac{1}{N}\sum_{i=1}^{N} \omega_{ig}(d_i; D_i) \quad \text{.....} \quad ...(2)$$

In both simple and complex organizations, firm performance is just the average across the G goals:[5]

$$\Omega = \frac{1}{G}\sum_{g=1}^{G} \Omega_g \quad \text{.....} \quad ...(3)$$

[5] Averaging the G goals as a performance measure appears to be at odds with our argument earlier that managers are unable to integrate across disparate goals. We average the G goals simply as a statistic for reporting the results of the experiments. The averaging is not part of the experiment, i.e., managers in the model do not engage in averaging.

4.2. Modeling performance improvement efforts

We model performance improvement efforts as a local search process. Firm performance improvement efforts are pursued via incremental changes. Building on the long tradition within the organizational learning literature (Cyert and March 1963) and prior modeling efforts (Lant and Mezias 1990; Levinthal 1997; Rivkin 2000), we model a process of incremental performance improvement efforts. Within each firm, a randomly selected decision choice is flipped and performance is evaluated. The local search process may be usefully viewed as managerial decisions made with the objective of performance improvement on one or more goals.

A critical modeling choice is how performance is to be evaluated. Rational choice models make the assumption that divergent outcomes can be aggregated to an overall measure of performance. However, as we noted earlier, this assumption is contrary to a large body of empirical work that suggests that individuals struggle to integrate even comparable outcome events such as different categories of expenditures (Thaler 1985, 1999) let alone the challenge of reconciling more divergent outcomes.

Recognizing this evidence, we model the performance improvement efforts as a discrete evaluation of decisions across performance goals. A decision is evaluated against each performance goal independently, i.e., the decision should improve performance on at least one goal without causing performance deterioration on the remaining goals. This characterization corresponds to the satisficing criterion specified by Simon (1955).

More formally, for each time period, *t*, consider a decision choice d_{jt} that it is flipped to d'_{jt} (i.e., 0→1 or 1→0). Let firm performance on a single goal in time, *t*, be $\Omega_{gt} = \frac{1}{N}\sum_{i=1}^{N} \omega_{ig}(d_i; D_i)$ and let Ω'_{gt} be the performance with d'_{jt} substituted for d_{jt}. Then,

$$d_{j(t+1)} = \begin{cases} d'_{jt} \ if \ \Omega'_{gt} > \Omega_{gt} \\ d_{jt} \ otherwise \end{cases} \forall \ g = \{1,...G\} \text{.....(4)} .$$

4.3. Modeling organization structures

We consider loosely coupled structures as a representation of complex organizations. This structure maximizes interdependencies within departments and minimizes interdependencies across departments. This representation is based on Simon's (1962) exposition of the architecture of decomposable systems (see Figure 1c in Ethiraj et al. 2008 for a graphical representation of loosely coupled structures).

For all experiments, the number of departments, M, and the number of decisions, N, were specified. We then created the M departments, where the kth department, m_k, is comprised of N/M decision variables. We assume each department to be equal in size to simplify exposition. The composition of each department, m_k, is determined according to the following rule:

$$m_k = \left\{ d_{(k-1)\frac{N}{M}+1}, ..., d_{k\frac{N}{M}} \right\} \text{where}, k \in \{1,...,M\}$$

We also assigned R interdependencies between the N decisions. In all experiments, N, M, and R were held constant.[6] Keeping R constant, we increase interdependencies within departments subject to the condition that within-department interdependencies are greater than between-department interdependencies. The M departments reflect the grouping of strongly interdependent decisions, i.e., interdependencies within departments is greater than the interdependencies across.

4.4. Modeling alternative design strategies

We examined the efficacy of three alternative strategies to mitigate the coordination challenge in dealing with multiple performance goals: temporal differentiation, goal myopia, and spatial differentiation.

4.4.1. Temporal differentiation

We assigned the organization a single performance goal, p_g, drawn randomly from the G goals. The organization implements performance improvement efforts as in equation (4) based on an assigned goal, p_g. The goal, p_g, that guides performance improvement efforts is varied every t periods until all goals

[6] In our paper 'R' captures the total interdependencies in an organization. This is similar to the 'K' parameter in the NK models literature (Kauffman 1993). The difference is that K is defined at the decision choice level whereas R is defined at the organization level.

are sequentially attended to. Overall firm performance at each point in time, however, is an average across all *G* goals.

Managerial actions are evaluated for their efficacy based on departmental performance improvement (see the following subsection). In each period of the experiment, a randomly chosen department, *m*, engages in a performance improvement effort. An action is implemented if it results in departmental performance improvement on the particular goal in use at that time.

More formally, for each time period, *t*, consider a decision choice, $d_{jt} \in m_k$ that it is flipped to d'_{jt} (i.e., 0→1 or 1→0). Let department performance on a single goal, *p*, in time, *t*, be $\Omega_{pt(k)} = \frac{1}{|m_k|} \sum_{i=(k-1)\frac{N}{M}+1}^{k\frac{N}{M}} \omega_{ip}(d_i; D_i)$ where $k \in \{1,...M\}$ and $p \in \{1,...G\}$ and let Ω'_{gt} be the department performance with d'_{jt} substituted for d_{jt}. Then, $d_{j(t+1)} = \begin{cases} d'_{jt} \ \textit{if} \ \Omega'_{pt(k)} > \Omega_{pt(k)} \\ d_{jt} \ \textit{otherwise} \end{cases}$ .....(5).

4.4.2. Goal myopia

Goal myopia was implemented by assigning the whole organization one of the goals, p_g, chosen randomly from among the *G* goals. Whereas temporal differentiation involved changing the goals periodically, in the case of goal myopia, the organization pursued improvement in the same goal throughout the experiment. Thus, goal myopia is a special case of temporal differentiation wherein periodicity of changing goals is set to zero. Performance improvement efforts are implemented as in equation (5) above. Overall firm performance is again an average across all *G* goals.

4.4.3. Spatial differentiation

Spatial differentiation of performance goals was implemented by assigning each department one of the *G* performance goals, p_g. In each period of the experiment, a randomly chosen department attempts to improve performance on its assigned goal, p_g. The performance improvement efforts are implemented as specified in equation (5) above. Overall firm performance continues to be an average across all *G* goals.

5. Analysis

The analysis is reported in two sub-sections. In the first sub-section, we present the baseline results exploring the implications of multiple performance goals in simple and complex organizations. In the second sub-section, we report the results of the second experiment where we examine the efficacy of goal myopia and spatial and temporal differentiation respectively in complex organizations.

5.1. Baseline results: Multiple performance goals

Our first research question sought to examine how multiple performance goals, even in simple organizations, will affect organizational performance. In an effort to examine this question, we set up a firm with N=24 decisions, R=0 (i.e., there are no interdependencies between decisions in a simple organization), M=4, and G is varied from 1 to 8. In each period, a randomly chosen department in the firm attempts performance improvement efforts via a local search process (see §4.2). Performance improvement efforts are evaluated against the G goals that the firm pursues. At the end of each period, we track average firm performance across the G goals. Each experiment is run for 250 periods and replicated 250 times to remove the idiosyncratic draws associated with any single run. The results are always averaged across the 250 replications.

Figure 2 presents the results of multiple performance goals implemented in a simple organization for various values of G. The figure shows the results at the end of the experiment. With one goal, the simple organization asymptotes at a performance level of about 0.66. Setting G=2 has a significant downward effect on the overall performance of the firm averaged across the two goals reducing performance to approximately 0.58. We see a concomitant reduction in performance as G increases, and at G=8 there is no performance improvement and the status quo is preserved. The intuition for this lies in the conflicts that each action creates when the relationship between actions and outcomes is of the one-to-many kind. Any performance improvement effort might improve performance on one or more goals while reducing performance on one or more other goals. When an organization is given multiple performance goals, each action is evaluated against all goals; and the actions that reduce performance are not adopted

at all. As the number of goals increases, the likelihood that an action will reduce at least one performance goal also increases and thus reduces the probability of engaging in performance improvement efforts.

We also replicated the same experiment in complex organizations. We set N=24, R=120, M=4 and varied G from 1 to 8. The results are shown in Figure 2 to provide a comparison with simple organizations. The qualitative pattern of results is identical to that seen in simple organizations. With an increase in G, there is a concomitant decrease in performance. Again, when G reaches 8, there is no performance improvement and the status quo is preserved. The performance in complex organizations is marginally superior in comparison with simple organizations for the case of one, two, and four goals respectively. This is because the interdependencies across decisions in the complex organization act to perturb the organization and get it off inferior local peaks. This benefit, however, disappears with an increase in the number of goals, suggesting that the effect of number of goals swamps the effect of decision interdependence in organizations. Overall, the baseline results confirm that multiple performance goals in both simple and complex organizations present severe coordination challenges. From hereon, we use these baseline results as a comparison to evaluate the efficacy of various strategies to cope with multiple goals. Thus, the baseline refers to a case where all G goals are simultaneously pursued in a model setting where N=24, M=4, and R=120.

5.2. Design strategies for multiple performance goals

5.2.1. Goal myopia

The first design strategy we proposed was goal myopia – focus on one goal to the exclusion of all others. Figure 3 presents the results of focusing on a single goal in comparison with the baseline. We set N=24, R=120, M=4, and examined G=1, 2, 4 and 8. The loosely coupled structure was created by retaining 90 interdependencies within departments and 30 interdependencies between departments.

Examining the results in Figure 3 and contrasting this with the baseline, we see that focusing on a single goal in guiding managerial decision making helps rescue organizations from the status quo trap. Focusing on only one goal in evaluating incremental search attempts helps break the conflicting constraints that emanate from trying to satisfy multiple goals, thus helping overcome the status quo trap.

As the number of ignored goals increases, however, the overall improvement from focusing on a single goal declines considerably, though there still is a clear improvement relative to performance in the eight goal regime in which essentially no progress is made beyond the initial performance level of 0.5.[7]

5.2.2. Spatial differentiation

Figure 4 presents the results of imposing a subset of goals on each department of the organization. We set N=24, R=120, M=4, and examined G=4 and G=8. Consistent with our definition, the loosely coupled structure was created by retaining 90 interdependencies within departments and 30 interdependencies between departments. We examined two alternative settings where each department is assigned one performance goal (i.e., G=4) and two performance goals (i.e., G=8), respectively.

Examining the results in Figure 4, we see that spatial differentiation of performance goals in comparison with the baseline indeed helps mitigate the coordination problem from multiple performance goals. Even when G=8, overall firm performance improvement occurs because each department is expected to improve only one or two of the performance goals of the firm. Each department makes performance improvement decisions based only on the subset of goals assigned to it. Even though one department's actions can undermine the performance goals of other departments, the myopic actions of each department are sufficient to improve the average performance of the firm on all goals. As the interdependence between departments (i.e., tight coupling) increases, we expect the performance improvement to decline (we confirmed this in experiments not reported here). Thus, we find that spatial differentiation of performance goals in a loosely coupled organization with each department pursuing a subset of the firm's performance goals partially mitigates the coordination problem of multiple goals. [8]

5.2.3. Temporal differentiation

We proposed that temporal differentiation of performance goals will mitigate the coordination problem of fostering managerial action when facing multiple performance goals. We set N=24, R=120,

[7] This raises the question of whether it is always optimal to consider only one goal. We modeled the consideration of 2, 3, and 4 goals in the overall 8-goals regime and found that performance is lower (though statistically not significant) when more goals are considered in decision making. Of course, as the number of goals continues to increase, organizational performance eventually declines as we have demonstrated.

[8] In analyses not reported in the paper we allowed the number of departments M to deviate from the number of goals G. The results were largely similar to the results reported here. These results are available from the authors.

and G=4 or G=8. The organization pursued only one goal, p_g, at a time, though firm performance was evaluated as an average of the G goals. When G=4, the performance goal was changed every 63 periods, and when G=8, the goal was changed every 32 periods.

Figure 5 presents the results of implementing temporal differentiation of performance goals. As seen in the figure, temporal differentiation of goals results in significant overall firm performance improvement across all G goals. A critical factor underlying this result is in the weak correlation among the G performance goals. With weak correlations, performance improvement in one goal might sometimes hurt performance on one or more other goals (due to negative correlations) and other times help the performance on other goals (due to positive correlations). However, it is more important to engage in performance improvement actions along a single dimension of performance rather than face the paralysis of multiple, simultaneous, and incompatible goals.

When the performance goal is changed at period 63, we observe a sharp fall in overall performance. This is because the firm has reached a local peak on the assigned performance goal, and a shift to a new performance goal triggers a fall in overall firm performance primarily due to a performance decline on the prior goal (see Gavetti and Levinthal 2000 for a related result). This is akin to an organization first pursuing cost reduction for several years and subsequently switching to quality improvement. In this case, when the firm switches to the goal of improving quality, it would see some cost increases as a consequence. Similarly, in the eight goal case we again see performance improvement, though the improvement is less significant. This contrast in result between the case of 4 and 8 sequential goals is a function of the performance improvement method employed in the experiment. The process of local search to generate performance improvement on a complex performance landscape is extremely slow, and 32 simulation periods is insufficient to generate significant performance improvement. Even though a precise mapping between simulation periods and real time is not possible, the results suggest that rapid changes in performance goals in complex organizations will be counter-productive.

Finally, Figure 6 compares all three strategies against the baseline. The parameters for the models in Figure 8 were set at N=24, M=4, R=120, and G=4,8. All three strategies perform better than the baseline in both cases when G=4 and G=8. There are, however, some qualitative differences in the

effectiveness of the strategies. Whereas the three strategies are about as effective when G=4, spatial differentiation is superior to both myopia and temporal differentiation when G=8. With an increase in the number of goals, myopia and temporal differentiation direct attention at an increasingly smaller set of goals. In contrast, spatial differentiation directs attention at the full set of goals via allocation to different departments. This facilitates the simultaneous pursuit of multiple goals, albeit in a departmentally segmented fashion. In addition, since temporal differentiation of performance goals produces sharp falls in performance when there is a change in the goal pursued, the benefits stemming from the temporal differentiation of performance goals need not hold for all time horizons.

The results above are crucially dependent on two assumptions: (1) incommensurability of goals or the assumption of bounded rationality of managers, and (2) each decision affects multiple goals. Evaluating our results turns on the veracity of these two assumptions. On the issue of incommensurability of goals, we provided extensive empirical evidence from psychology (Dawes 1979; Dawes et al. 1989; Heath and Soll 1996), sociology (Zelizer 1989), and economics (Thaler 1985; Kahneman and Lovallo 1993; Camerer et al. 1997; Thaler 1999) that support this assumption. If we allow individuals to reduce the impact of decisions to an aggregate scalar value then the problem of multiple goals is trivial and indeed much of our results will not hold. Thus, the assumption of bounded rationality of managers is critical. The second assumption that each decision affects multiple goals is again supported in the empirical literature which documents weak correlations among goals (Meyer and Gupta 1994; Meyer 2002). The only way each action can affect only one goal is if that action is unrelated to all other goals. In the aggregate, if this were true, then we would observe only zero correlations among goals. The only reason goals are correlated is because a single action affects multiple goals. Thus, the realism of this assumption is also rooted in prior empirical work.

5.3. Robustness of the results to alternative parameter settings

With the exception of the initial analysis of simple organizations, the results we reported averaged performance across all G goals regardless of the correlation structure among the decisions. There is, however, a concern whether the effectiveness of the employed strategies is sensitive to the

correlation structure among the goals. We examined this possibility. Over the 250 periods of the experiment, we computed the average correlations among the *G* goals at each period to estimate the correlation structure among the goals on a given landscape. While this correlation was designed to be zero on average since the performance goals were drawn from an *i.i.d*. uniform distribution, empirically there were small correlations among the goals. Based on the computed correlations, we separated the results into those with positive correlations (goals are positively reinforcing) and negative correlations (goals are negatively reinforcing). The results were largely robust to this separation. We found that all three strategies help rescue organizations from the status quo trap regardless of whether goals are positively or negatively reinforcing. Second, consistent with expectation, we found that performance with multiple goals is higher when goals are positively related in comparison with the case when goals are negatively related. Third, we found that goal myopia is the best strategy when goals are positively related. When goals are positively correlated, assigning one goal to managers is sufficient to generate significant performance improvement across all goals. In contrast, when goals are negatively correlated, goal myopia hurts performance since pursuing this single goal hurts performance on the remaining goals. In such a case, temporal separation of goals outperforms goal myopia simply because changing the goal periodically better helps manage the tradeoff among negatively correlated goals. Thus, with increasing negative correlations among goals and increasing interdependencies among departments, temporal separation of goals appears to be a superior design choice. [9]

In the interest of focusing sharply on the problem of multiple goals, we held organization structures constant and modeled them as loosely-coupled design structures. It is important to consider to what extent our results are contingent on the particular structure of interactions analyzed. To assess the robustness of the results, we re-ran all the analysis using tightly coupled design structures. The results in this alternative regime were generally qualitatively similar to those under the loosely coupled structure. Among the salient differences, we found that the effectiveness of goal myopia is somewhat diminished. This difference stems from the fact that the significant interdependencies between departments outweigh the performance gains from myopic pursuit of goals. This same effect makes spatial differentiation less

[9] These results are not included in the paper in interests of space. They are available from the authors on request.

effective. In the presence of significant interdependencies between departments, allowing each department to pursue its own goals creates continual conflicts in the departmental performance improvement efforts and hurts organizational performance (see footnote 9).

In addition to the goal prioritization strategies that we varied, we made a number of different choices in the simulation. We set N=24, M=4, R=120, and G ranging from 1 to 8. An important concern is whether the results are idiosyncratic to the specific choices of these parameters in the simulation. We performed a number of robustness checks to rule out this possibility. First, we set N=16, 32, and 60 and retained all other choices at their default values and reran all the analyses. The results were robust to all these changes in N. For each of these values of N, we also varied M=2, 4, 6, and 8, R=80, 120, 160. All the results were largely similar to that reported in the paper. Finally, we increased the number of goals G to 16 via two step increments. Though the overall performance improvement declined, the efficacy of the three strategies in rescuing organizations from the status quo trap remained robust. We also modeled performance improvement efforts as a local search process. One possible concern is that the lock-in to the status quo is simply a function of the limited scope of performance improvement efforts. To explore this possibility, we also incorporated a long jump performance improvement effort wherein managers simultaneously change 25 percent of the decisions in an organization and this is done every 25 periods. The results, once again, are robust to this alternative search process, giving us confidence that the results are not driven by the particular search process that we implemented (see footnote 9).

Finally, there is the issue of how the structure of the landscape changes as we increase the number of goals. There is the concern that a decline in average performance with an increase in the number of goals is simply a function of a decrease in the height of the global peak. To address this possibility we generated all the results in this paper setting N=12, M=3, R=36, and G=1-8 and normalized steady state performance by the height of the global peak. All the results were qualitatively similar to that reported in the paper.[10]

[10] We lower the value of N to 12 for this robustness analysis as the computational demands of identifying the global peak is prohibitive when N=24.

6. Discussion

We attempted to direct an organization theorist's lens at the challenge posed by multiple performance goals in complex organizations. With respect to the two research questions that we posed at the outset, our analyses reveal clear patterns. First, we find that in both simple and complex organizations, the simultaneous pursuit of multiple performance goals leads to a lock-in to the status quo. This lends some support to Jensen's (2001) assertion that asking managers to pursue multiple goals creates problems, though not "confusion and lack of purpose" as he suggests but rather a status quo bias. This is because a single decision can have implications for multiple performance goals and freezes managerial action when a decision improves one performance goal but undermines one or more other goals. Thus, our analysis formalizes the managerial challenge of dealing with multiple performance goals. Second, we find that goal myopia, spatial differentiation, and temporal differentiation of performance goals mitigate the status quo bias that plagues the simultaneous pursuit of multiple performance goals.

Returning now to the puzzle presented by the juxtaposition of Jensen's (2001) argument with Meyer's (2002) evidence, we conclude that imposing multiple goals does create coordination challenges in organizations even without interdependencies between decisions. That said, we find that a variety of local and myopic strategies are effective in helping deal with multiple goals. Thus, we conclude that imposing multiple goals on managers does not condemn them to confusion and lack of purpose. Rather, the critical managerial challenge is to design effective strategies to deal with multiple goals, especially if multiple, intermediate goals are an inevitable feature of complex organizations.

Having established the existence of the multiple goals challenge in organizations and the relevance and effectiveness of some strategies to deal with them, we would like to emphasize the importance of this issue to the organizations literature. Whereas the issue of divergent interests and preferences among members has received considerable attention in the organizations literature, much of the ensuing debate has adopted the agency perspective and emphasized the design of incentives to mitigate such agency problems. In contrast, the multiple goals problem is difficult to satisfactorily resolve using incentives alone (Hölmstrom and Milgrom 1991), which raises the salience of broader interventions such as job design. Heath and Staudenmeyer (2000) reviewing the empirical evidence suggest that

individuals in organizations exhibit a strong partition focus (focus on task partitioning rather than integration) and component focus (focus on single components of a tightly integrated set), which compounds the challenge of multiple goals. Furthermore, they argue that this is not an agency problem that can be solved with incentives but rather a coordination problem rooted in bounded rationality. Thus, we believe that greater attention to the interaction between decision interdependence and goal interdependence promises to enrich and advance our understanding of how organizations function.

The problem of organizational goals is not a new one. However, much of our attention to this issue has been focused on conflict among actors as in agency models and analyses of organizational politics. But, independent of the issue of diverse objectives among actors, goals are necessary to direct action. Furthermore, this direction of action in settings of interdependent action and multiple performance desiderata creates fundamental organizational challenges. While accounting solutions such as the Balanced Scorecard speak to this challenge, we show that in a world of boundedly rational actors such interventions may prove quite dysfunctional. Counter-intuitively, in a world of boundedly rational actors, incomplete guides to action in the sense of providing only a subset of the underlying set of goals prove more effective at directing and coordinating behavior than more complete representations. Management, in the form of the articulation of a subset of goals, provides a degree of clarity and focus in a complex world.

More generally, the results show the importance of research premised on behavioral postulates of individual and organizational action in addressing some of the issues posed by the organizational economics literature. The robustness of the findings of this literature to shifts in premises about individual behavior should not be taken for granted. There is an important need for organizational researchers to confront these results with the alternative starting premises of more limited conceptions of rationality. Thus, while the present analysis certainly is incomplete on a variety of dimensions, it provides a powerful demonstration of this need in the important context of the problem of multiple performance goals.

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	Single goal	Multiple goals
Simple organization	**I**	**II**
Complex organization	**III**	**IV**

Figure 1 Organizations and performance goals

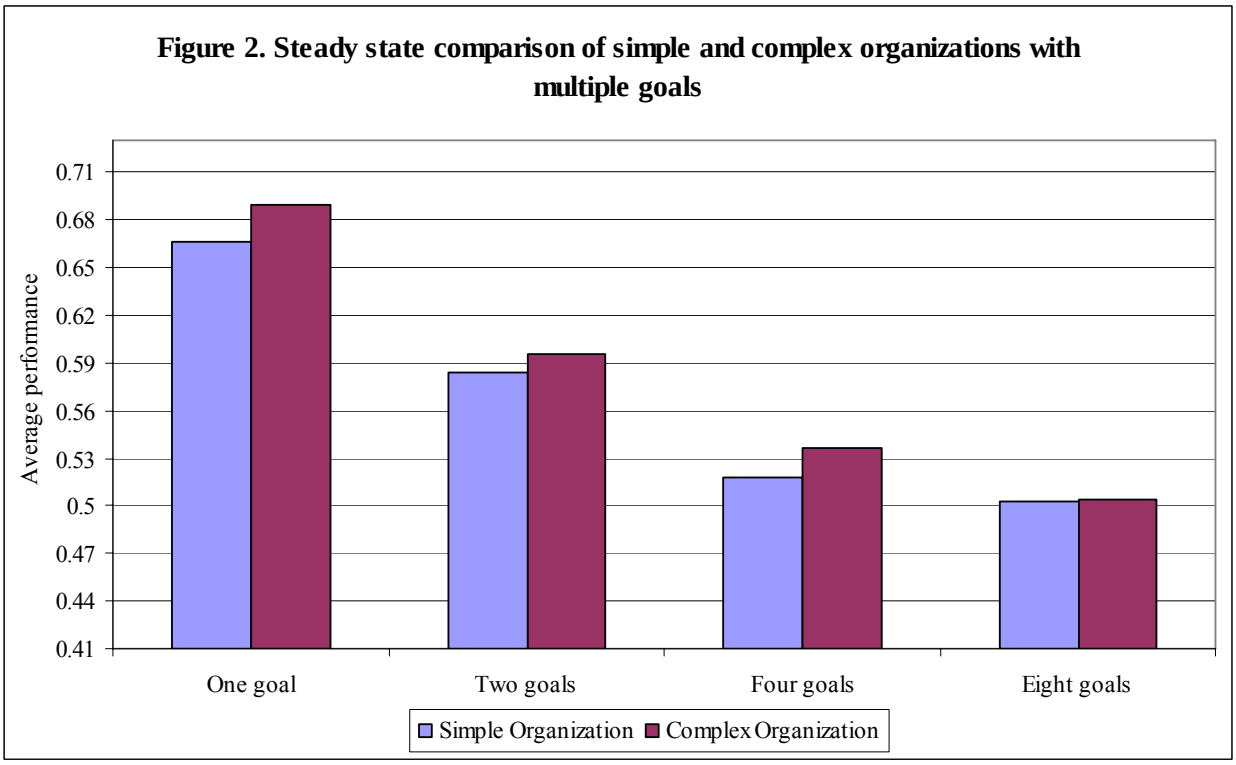


Figure 3. Steady state comparison of goal myopia in complex organizations

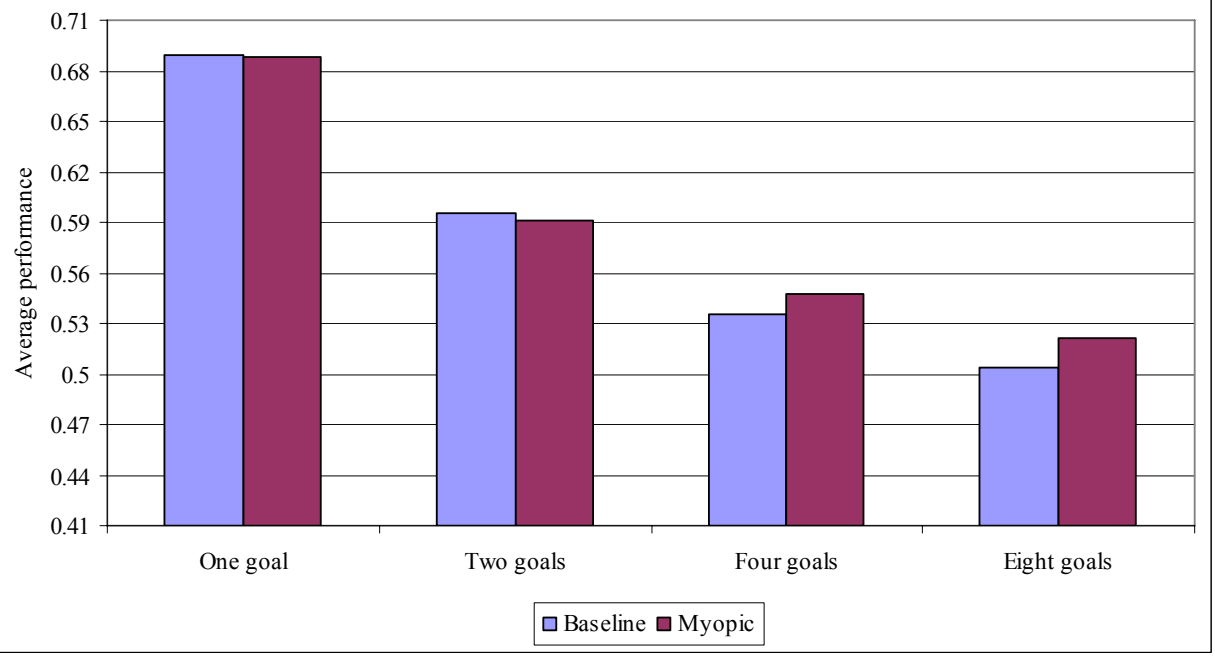


Figure 4. Steady state comparison of spatial differentiation in complex organizations

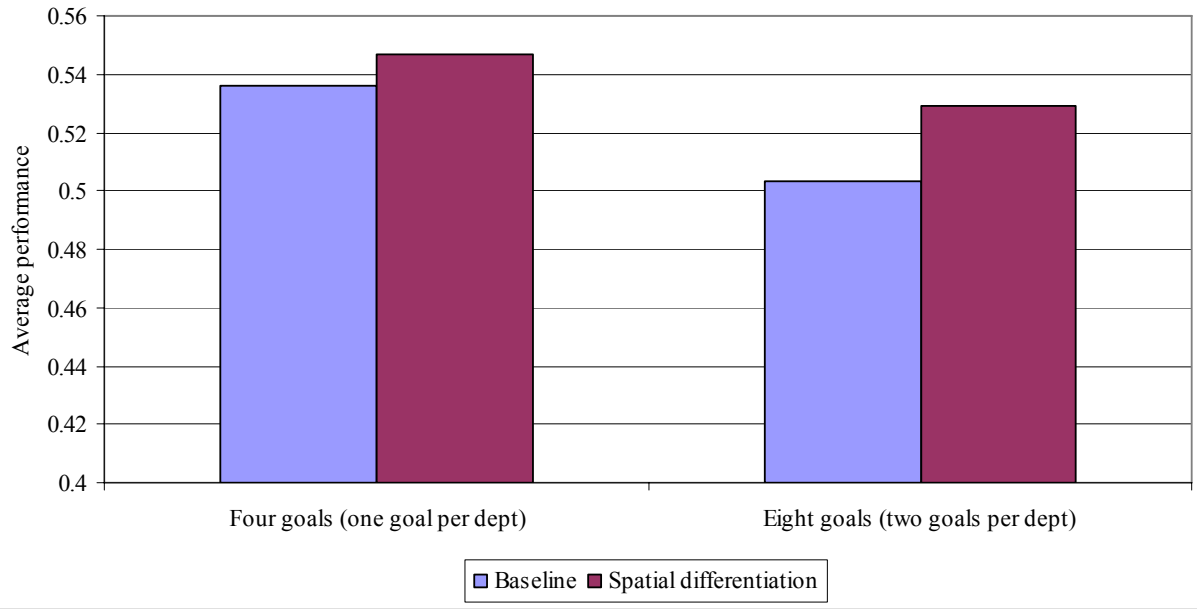


Figure 5 Comparing temporal differentiation of goals in complex organizations

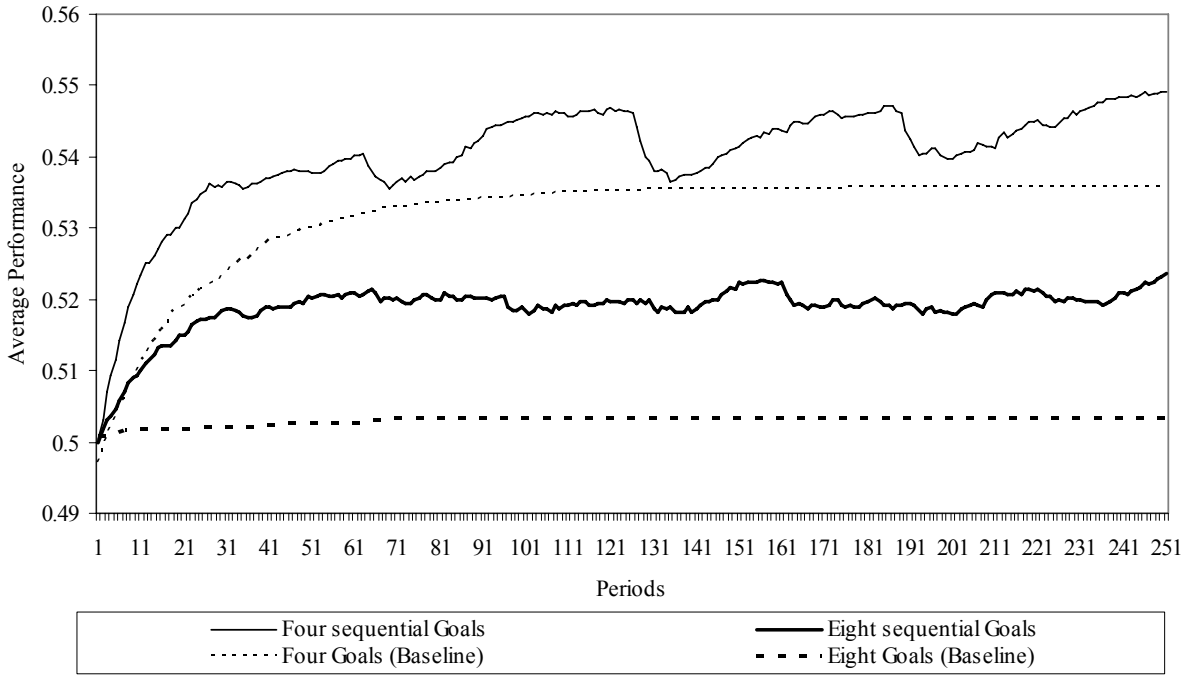
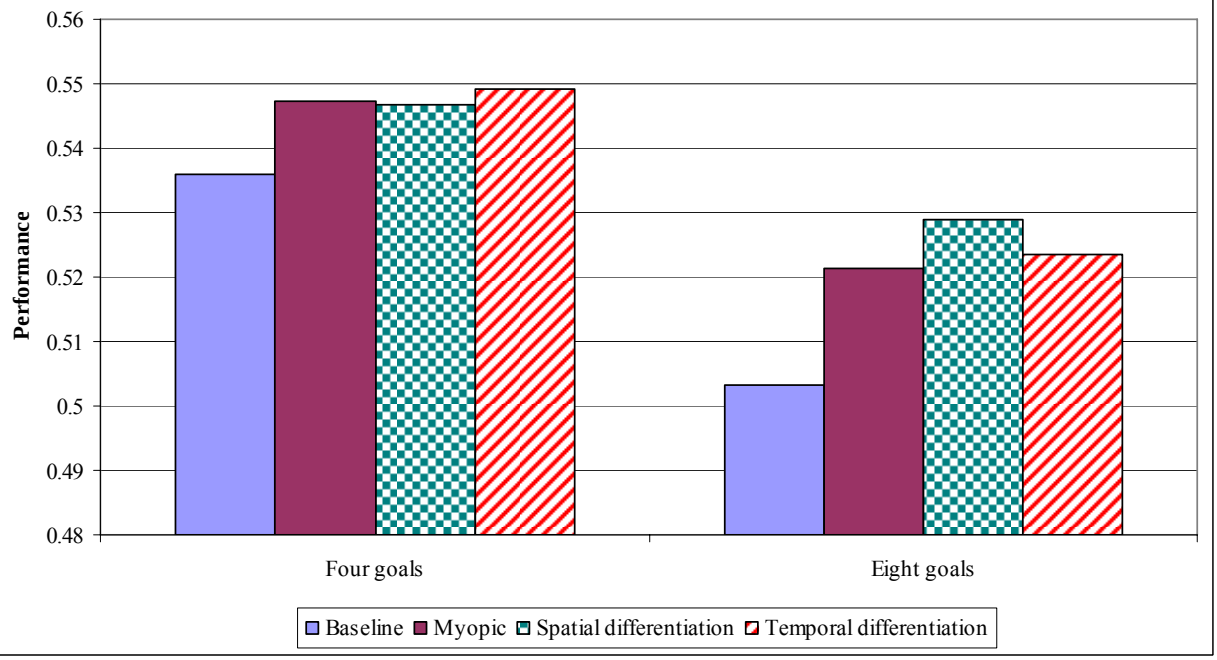


Figure 6 Comparison of steady state performance of the three strategies



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