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The Effects of a Combination of Feedback, Goals, and Consequences on the Performance of Four Small Businesses

Timothy V. Nolan
Western Michigan University

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THE EFFECTS OF A COMBINATION OF FEEDBACK, GOALS, AND CONSEQUENCES ON THE PERFORMANCE OF FOUR SMALL BUSINESSES

by

Timothy V. Nolan

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Submitted to the
Faculty of The Graduate College
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THE EFFECTS OF A COMBINATION OF FEEDBACK, GOALS, AND CONSEQUENCES ON THE PERFORMANCE OF FOUR SMALL BUSINESSES

Timothy V. Nolan, Ph.D.
Western Michigan University, 1999

Performance measurement approaches such as the Balanced Scorecard (BSC) offer a format for attending to a few performance metrics rather than several different performance indicators. While the BSC approach offers a nice format for tracking performance, it does not provide a conceptual framework for improving performance. That framework can be found in Behavioral Systems Analysis. The Total Performance System emphasizes the importance of internal and external feedback in improving performance. Several studies have investigated feedback interventions in organizational settings. The intervention found to be most effective is a combination of feedback, goals, and consequences. The purpose of the current study was to investigate the effectiveness of a combination of feedback, goals, and consequences in improving the performance of four small businesses.

The participants in this study were four chimney restoration companies. The setting was the office of the supplier who provided restoration materials to participants. The dependent variables were the number of marketing contacts, the number of estimates, the volume of completed work, and the volume of backlog work. The independent variable was a combination of feedback, goals, and consequences. The participating companies received feedback on the most recent 13 weeks of performance. Companies were given weekly feedback for each of the dependent measures. A goal line appeared on each feedback graph. If the company met or exceeded the goal on 13
of chimney restoration mix. If the company met or exceeded the goal on at least 33 occasions it received a discount of $1.00 per bag.

The combination of feedback, goals, and consequences yielded no improvement in the dependent measures for the companies participating in this study. Companies #2 and #4 stopped submitting performance data early in the intervention. In general, the performance of Companies #1 and #3 was unaffected. Based upon the results obtained in this study, it is not possible to conclude that the intervention was effective in improving the performance of the participants. The implications of this study for future research, as well as the implications for small businesses are discussed.
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I owe an incredible debt of gratitude to my advisor Dr. Dale Brethower. Dale has not only been an exemplary guide and mentor during my graduate studies, but he is a cherished friend. He has taught me that the key to being a competent professional lays not in the answers you give, but the questions you ask. It is a distinct honor and privilege to work with him on any project. He has made my graduate program an exciting, engaging, and thoroughly enjoyable experience.

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Acknowledgments—Continued

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Timothy V. Nolan
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CHAPTER I

INTRODUCTION

Defining Small Business

The definition of a small business varies across industries, countries, agencies, and authors. Atkins and Lowe (1997) note that as many as 40 different definitions of small firms have been reported in the literature, and that there is generally very little consistency in the criteria used to define small business. They further explain that firms have been deemed “small” according to either the number of employees, value of annual receipts, or management structure. During United States Congressional Hearings on small business size standards (1981), Senator Orrin Hatch observed, “The question of what constitutes a small business has long been openly debated by every major sector of the small business community”(p.1). Similarly, Walker and Petty (1978) recognize that it is difficult to settle on a single definition of a small business because everyone seems to have his or her own idea about what constitutes a small business. The Small Business Administration (SBA) loosely defines a small firm as an independently owned and operated firm which is not dominant in its field of operations. More specifically, they consider a small business (for manufacturing and mining firms) one which employs fewer than 500 people (“Guide to SBA Definitions”, 1996). Atkins and Lowe (1997) note that while a small firm in the United States has less than 500 employees, the United Kingdom uses an upper limit of 200 and Australia a limit of 50 employees. A different classification system is reported by Haksever (1996) which divides small firms into three categories: Very small (1-19), small (20-99), and medium (100-499).
In the United States, the SBA may also classify a business as small if the average annual receipts do not exceed $5.0 million. This method of classification applies primarily to firms involved in non-manufacturing industries. Annual receipts refer to a company's gross total income and total cost of goods as reported on Federal Income Tax returns. Annual receipts are averaged across the last three fiscal years to obtain the average annual income for that firm ("Guide to SBA Definitions", 1996). While this measure is used by the SBA as a broad classification variable, exceptions to this rule do exist (For more specific size standards for small businesses see the Guide to SBA Definitions of Small Business, 1996).

Atkins and Lowe (1997) argue that the management structure and decision processes of an organization should be the primary indicator of a small firm. They explain that statistical definitions of smallness such as number of employees, or annual receipts may omit significant dimensions of small firms. In particular they call attention to the involvement of the business owner in the strategic planning, forecasting, and performance comparison of small firms, while the owner of a large firm typically does not participate in these processes. Similarly, Haksever (1996) notes of small firms, "The management is independent; usually the owner is the manager and reports to no one..."(p.34). Furthermore, Resnik (1988) argues that one of the defining features of small firms is the involvement of the owner-manager in setting the business priorities, objectives, and standards, as well as determining how assets will be allocated. In other words, a firm may be classified as small based upon the role of the owner-manager and the extent to which this person participates directly in the management processes of the business.

For the current paper the summary provided by Haksever (1996) will serve as the general definition of a small business. This summary incorporates the guidelines established by the SBA ("Guide to SBA Definitions of Small Business", 1996) and
arguments provided by Atkins and Lowe (1997). Haksever (1996) defines a small business as one with fewer than 500 employees and exemplifying the following characteristics:

1. Management is independent: usually the manager is also the owner.
2. Capital is supplied and ownership is held by an individual or a small group.
3. The area of operations is mainly local; workers and owners tend to be in one home community, although the markets need not be.
4. The business is small compared to the biggest units in the field (p.34)

Scope and Importance of Small Business

The term “small” business may connote an organization of diminutive stature; however, the economic impact of small firms in the United States can be characterized as anything but small. As Blackford (1991) notes, “...to a far greater extent than most Americans realize, the economy’s vitality depends on the fortunes of tiny shops and restaurants, neighborhood services and factories”(p.106). In the “Small Business Answer Card” (1997) the SBA reports the following facts about small businesses in the United States:

1. From 1987-1997 nearly all new jobs were created by small businesses.
2. 99% of all employers are small firms.
3. Small firms employ 53% of the private work force.
4. 47% of all sales receipts are generated by small businesses.

Resnik (1988) explains that the small business sector perennially represents one of the largest and most critical growth segments of the economy and that, “Nearly a million new businesses are launched every year”(p.1). Indeed, the SBA reports that in 1993 alone small businesses were responsible for adding 1 million new jobs to the work force, while larger companies eliminated over 200,000 jobs in the same year (“State of Small Business”, 1994). In addition to these facts, several authors (i.e., Bean, 1993; Burbank & Roberts, 1997; Dugan, 1996; Fairley, 1997; Mehling, 1997; Morrall, 1997;
Richman, 1997; Speechly, 1997; Tapp, 1997) have recently called attention to the critical role of small businesses in shaping the U.S. economy.

The impressive economic impact of small firms seems to be a phenomenon of the last 20-30 years. Blackford (1991) provides a nice summary of some of the historical variables which have led to the current preeminence of small businesses. He traces the beginning of this trend to the early 1970’s when economies in Japan and Europe gained considerable strength. As these economies became more highly developed, companies in Japan and Europe began to compete vigorously with large manufacturing corporations in the United States—forcing those firms to engage in dramatic cost-cutting strategies, resulting in the flurry of down-sizing seen in the 1980’s and continuing in the 1990’s. As large corporations eliminated thousands of jobs, the marketplace became flooded with highly skilled, talented, and educated individuals looking for work (Blackford, 1991). While large companies were forced to cut back on staff and services, smaller firms began to experience growth. As Speechly (1997) explains, smaller firms with lower overhead costs (compared to large companies) were able to offer comparable services and products at lower fees. Furthermore, a large pool of highly experienced labor became available for employment at smaller firms as a result of the down-sizing occurring in larger corporations. Thurik (1996) summarizes the situation when he says, “...it was something of a shock when a few pioneering economists discovered only recently that a substantial shift in economic activity had taken place away from large established firms and towards small, new ones” (p.149). Hence, small companies could now offer highly valued expertise, goods, and services while larger firms were still forced to down-size due to increased competition.

Richman (1997) explains that another development which has contributed to the recent success of small businesses has been the considerable advances in computing
and telecommunications technology. Advances in cellular and long-distance telephone service, internet technology, and the speed and power of personal computers has allowed smaller firms to operate at greater speed and at lower costs than large companies. McCollum (1996) states, “The marriage of computing and telecommunications technology is beginning to reshape the way small businesses operate...”(p.17). Mehling (1997) notes, “Small businesses are now doing just about everything with computers that their bigger counterparts have been doing for years” (p.105).

The net result of these contributing factors (e.g., down-sizing, technology) has been the unprecedented growth and impact of small firms upon the U.S. economy (Blackford, 1991). Furthermore, the SBA statistics on new business start-ups indicate that not only are small businesses being created at an impressive rate, but they are surviving longer as well. In 1993 and 1994 the rate of small business bankruptcies declined by 11.5% and 15.4% respectively (“State of Small Business”, 1996), and since 1982 the number of small businesses in the U.S. has increased 49% (“The Facts About Small Business”, 1996).

Further evidence of the impact of small business upon the economy is the level of legislative and financial support from the federal government. Blackford (1991) notes the tendency of the U.S. government to reduce regulatory burdens upon small businesses and identifies several actions (e.g., Regulatory Flexibility Act, Toxic Substances Control Act) taken by the U.S. Congress and the Executive branch of government designed to ease regulation of small firm activities. More recently, President Clinton signed the Small Business Regulatory Enforcement Fairness Act (SBREFA) granting small companies the right to sue any agency that does not consider the effects of its regulations upon small businesses (Fairley, 1997).
The federal government also offers several billion dollars annually, in low-interest loans for small business development—administered by the SBA. In 1996, the SBA approved 45,800 loans for a total of $7.7 billion. Beginning in 1998, the SBA will make available more than $14 billion for loans to small firms ("President's Fiscal Year Budget Proposal", 1997). In addition to the substantial investments made by the federal government, commercial lenders have begun to recognize the small business community as a potentially lucrative area of investment. Morrall (1997) states, Large banks such as Wells Fargo, are launching credit products nationwide through direct mail and telemarketing, while Bank of America is extending its reach by offering small business loans through loan production offices across the country. Nonbanks like Merrill Lynch and The Money Store, have steadily been expanding their reach into the small business market. (p.43)

Bean (1993) reports that 91% of the banks surveyed in a recent study plan to expand their small business activities. As an example of such expanded activities, Morrall (1997) cites Hibernia National Bank in New Orleans, LA, which increased its small business loan balance from $100 million in 1992 to $1 billion in 1996. Finally, the SBA reports that in 1996 commercial lenders approved $848 billion in loans to small businesses, which represents an increase of 5.3% over the $806 billion loaned in 1995.

The prospects for continued growth of the small business sector appear to be promising; however, the reasons for this optimism vary across authors. Burbank and Roberts (1997), Morrall (1997), and Yellen (1996) indicate that the behavior of commercial lenders and a robust economy are reasons for continued growth of the small business sector. In particular they note improved service strategies, information systems, and small-business credit lines within commercial banks, as healthy signs of small business growth. Furthermore, the increased level of competition among commercial lenders for the business of smaller firms is cited as well. Newland (1997) argues that small firms will continue to flourish because they will continue to offer better service and more flexibility than larger firms, while Acs (1996) and Richman
(1997) are of the opinion that small businesses will sustain growth simply because the marketplace will always necessitate an alternative to large companies.

Owning and Operating a Small Business

While the outlook for the development of small businesses is apparently quite good, the challenges facing the owners of small firms are daunting and require a great deal of management skill. Bauce (1969), Haksever (1996), and Resnik (1988) note that most small businesses are either family-owned or closely held by a small group of non-related individuals, and that owners typically act as the managers of the business. This arrangement differs considerably from that found in larger firms where the ownership and management functions are typically separate roles, maintained by separate individuals (Brown, Hamilton, & Medoff, 1990). The combination of owner and manager of a small firm requires this individual to not only provide the strategic focus and financial resources necessary to operate the firm (Atkins & Lowe, 1997), but also to control the daily operations of the company in accordance with the strategic focus (Resnik, 1988). The dual role of owner-manager requires this individual to monitor a substantial amount of information about the performance of the company. Atkins and Lowe (1997) note that the owner must attend to financial data such as money available for payroll and expenses, tax payments, new business contacts, advertising, and loan payments. Resnik (1988) explains that managing the daily operations of a firm requires attention to information about timelines, schedules, hours worked, inventory levels, and staffing. When one individual (owner-manager) has the responsibility for managing the finances and daily operations of a firm, she or he is faced with collecting, understanding, and utilizing information from several sources. In short, the small business owner-manager is required to make sense of and use a
great deal of information. Making use of this information requires a substantial amount of time and effort.

Bauce (1969) explains that while some owners may attempt to function as both owner and manager of their small business, the more common practice is "seat-of-the-pants" management. That is, the owner-manager manages both the finances and daily operations of the firm with very little reliance on performance information of any sort. In this case, the owner-manager survives from month-to-month by making sure that enough money is available to make loan payments, payroll, and meet overhead expenses. When money from business transactions is not available to pay these expenses, the owner typically relies on personal savings to the extent that they are available. Carbone (1980) echoes Bauce's (1969) argument when he states, "The underlying cause of most failures appears to be incompetent or inexperienced management" (p.36). He goes on to explain that the inexperienced owner-manager of a small enterprise pays little attention to trends in the sales, profits, and debts of the firm and is concerned with the amount of cash available for operations. Carbone (1980) states, "Too many entrepreneurs think additional cash will solve all the problems. Sound management--not money--is the key to a successful business" (p.37). Both Bauce (1969) and Carbone (1980) argue that good management of a small business requires careful attention to and use of data regarding sales, profits, and debts in addition to monitoring working capital.

Given the financial situation of the typical small business owner-manager, it is not surprising that working capital would be given attention to the exclusion of other performance indicators. Unlike the manager of a large company, the owner-manager has considerable assets tied directly to the financial performance of the firm. The funding for small businesses typically involves the personal wealth of the owner combined with loans from commercial lenders or the federal government (Walker &
Petty, 1978). While the funding for large companies may also come from commercial lenders or private investors, the larger firm has a distinct advantage with respect to finances: Losses in one part of the company can usually be covered with funding from other sectors of the organization (Calvin, 1995; Cohn & Lindberg, 1972; Mathes, 1967). For the small business owner-manager, poor financial performance is usually covered by personal savings (if available), additional debt, or the business simply fails (Resnik, 1988). Mathes (1967) points out that the smaller company, "...cannot afford to make bad decisions" (p. 10), and Resnik (1988) explains that small companies tend to be cash-thin and that, "The margin for error in the small business is slim" (p. 6). Thus the financial vitality of the firm—paying the monthly bills, tends to be one of the foremost concerns for the small business owner-manager.

Given these fiscal circumstances, it is not unreasonable to expect small business owners to devote considerable attention to the financial vitality of the business—potentially neglecting other measures of the firm's activities. The owner of the company may be more sensitive to the amount of money available to make loan payments, meet payroll, and cover operating expenses, and less sensitive to measures of internal processes, customer service, or development of new goods and services. While the financial stability of the company is critical, effective management requires attention to these other areas of company performance as well (Kaplan & Norton, 1992). Van de Vliet (1997) states, "...financial indicators on their own, however conclusive they may seem in their air of numerical precision, are neither an adequate measure of competitiveness nor a guide to future performance" (p. 78). While it is important for owner-managers to monitor the financial health of the company, effective management of a business requires attention to a balanced combination of performance indicators.
Kaplan and Norton (1992) introduced the concept of the Balanced Scorecard (BSC) to provide managers with a tool to more effectively guide their organizations. The BSC is premised on two notions: (a) The performance of a company cannot be adequately assessed by looking at financial measures alone; and (b) most organizations use too many measures when only a few key indicators would suffice. Kaplan and Norton (1993) explain that the purpose of the BSC is to provide a comprehensive framework for evaluating performance that is comprised of a coherent set of measures related directly to the mission and strategy of the company. More specifically, the BSC is comprised of key measures in the areas of finances, internal processes, customer service, and company growth (See Figure 1).

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<td>• Cash Flow</td>
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<td>• Efficiency</td>
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Figure 1. Example of a Balanced Scorecard (Adapted from Kaplan & Norton, 1992).
Kaplan and Norton (1993) explain that the BSC is a tool which can be used to translate the mission or vision statement of the organization into a more specific strategy comprised of the financial, customer, internal, and innovation and learning perspectives. For each of these perspectives critical goals are identified, followed by performance measures which are linked to each of these goals. The performance measures represent the scorecard by which middle and senior-level managers can monitor the performance of various aspects of the company. Thus, the very broad mission or vision of the organization is systematically translated into an increasingly specific manifestation of the future direction of the organization.

Although the Balanced Scorecard represents a unique approach to measuring the performance of an organization, it is primarily described in relation to large companies and the implications of this method for the small business owner-manager are as-of-yet untested. Only recently (See Chow, Haddad, & Williamson, 1997) has the potential utility of the BSC for small businesses been discussed. As noted earlier, the concerns of the owner-manager in the small firm are likely to differ from those of the owner or the manager of the large firm. Furthermore, the difficulty faced by the owners of small firms is that their time is divided between acting as the financial proprietor and performance manager of the firm. The advantage of the BSC approach for the small business owner-manager is that it offers a format for simplifying the analysis of performance data. An owner-manager can manage more effectively by concentrating on a few carefully selected variables than she can by analyzing a multitude of indicators (See Kaplan & Norton, 1993). The BSC format focuses attention on the most important variables rather than all of the variables. The disadvantage of this approach is that it does not include any guidelines for shaping performance. The BSC provides a nice format for tracking performance, but it does not explain how the data generated
using this approach can be used to modify the performance of groups and individuals. Such a framework can, however, be found in the field of Behavioral Systems Analysis (BSA).

Behavioral Systems Analysis

Defining Behavioral Systems Analysis

Krapfl and Gasparotto (1982) provide a general description of BSA when they state, "Behavioral systems analysis comes from a synthesis of the fields of behavior analysis and systems analysis. Certain features of each of these approaches have been incorporated into the behavioral systems analysis perspective" (p.22). According to these authors BSA is characterized by three principal features: (1) A focal interest in human behavior; (2) The relationship between individuals and their environment; and (3) The functional analysis of how behavior influences the environment, and is influenced by the environment. They go on to note that BSA is the, "...analysis of behavior that occurs in complex social environments" (p.22). Malott and Garcia (1987) provide a more specific characterization of BSA as:

...the analysis of behavioral systems, the design, evaluation, and modification of systems to help them accomplish their objectives, an attempt to find the ultimate objectives of the unorganized ‘organization’ and then to help it get organized, to function as a smooth system with all components working toward the same set of ultimate objectives. (p.133)

In short, BSA can be characterized as an approach to understanding complex social environments by analyzing the behavior of individuals and groups within those environments.
Viewing Organizations as Systems

Dickinson (1982) explains that any organization consists of multiple systems which interact and influence one another; furthermore, these systems are comprised of the behavior of individuals within the organization. The behavior of one individual is capable of impacting the behavior of groups of individuals, and thereby can affect the aggregate performance of those individuals. Changes in the performance of one group may result in changes in the performance of other groups and so on. Similarly, the actions of a group (or groups) may affect the performance of any one individual. Dickinson notes that because of the interdependency between individual and group performance in organizations, applied behavior analysis and systems analysis compliment one another nicely. She goes on to explain that while systems analysis allows an observer to understand the complexities of organizational environments and how individual and group performance is interrelated; applied behavior analysis allows the observer to ascertain the variables which shape and maintain individuals’ behavior in those environments.

Brethower (1982) explains that coping with the complexity found in organizational environments is critical to managing organizations effectively. He argues that managers typically rely on a great deal of highly specific information about the portion of the organization for which they are responsible, yet they are largely unaware of how their segment of the organization relates to other parts. Each segment may develop highly specific information for its own operations, and this permits that segment to operate effectively. However, while each manager strives to optimize the information and performance of her or his division, the overall performance of the organization may be sub-optimized (Rummler & Brache, 1995). In other words, while the parts of the organization are running very well, the entire organization may be
running out of control. Brethower’s (1972, 1982) Total Performance System (TPS) provides a conceptual model for understanding organizations from a behavioral systems analysis perspective and provides a tool for dealing with the complexity of organizational environments.

The TPS is defined by Brethower (1972) as, “...an adaptive system comprised of a set of components which, when operational, are sufficient to improve or maintain the performance of the system” (p.14). This model provides a method for determining how well the entire organization is currently performing, as well as determining the future performance required to meet customers’ needs. There are seven parts to a TPS: (1) An organization mission statement; (2) Inputs; (3) Processing system; (4) Outputs; (5) Receiving system; (6) Processing system feedback; and (7) Receiving system feedback. The manner in which each of the pieces of the TPS diagram fit together is illustrated in Figure 2. The Mission refers to some statement of the overall purpose of the system being considered. In the case of a small business, the mission may be to provide high-quality goods and services to customers, at the best price possible, while maintaining the profitability of the company. Inputs in the form of people, data, machinery, money, or materials enter the Processing system where value is added through a combination of labor and technology. For a small business, inputs may be sales/service orders which enter the processing system where various tasks are completed to fulfill that order. The results of the work within the Processing system are Outputs in the form of goods, services, products, or waste. Outputs are then delivered to various customers who comprise the Receiving system. Finally, separate Feedback loops extend from both the Processing and Receiving systems and become a source of Inputs to the Processing system. The Processing System Feedback loop provides information about the internal processes that are responsible for creating Outputs. Redmon and Wilk (1991) characterize this feedback as a quality check on...
outputs before they reach the Receiving system. Examples of this type of feedback may be manufacturing costs, percentage of scrap/waste, or cost of labor. The Receiving system feedback provides customer satisfaction information and reactions to the Outputs provided. Both of these loops are a critical part of the completed TPS because they provide information on the quality and adequacy of the Outputs provided to the customers.

A similar approach to understanding organizations is provided by Rummler and Brache (1995) who use a “Super-system Map” to analyze businesses. The Super-system is functionally identical to the TPS diagram in that both models contain essentially the same elements and share the same throughput format. That is, both models consist of inputs, a processing system, outputs, a receiving system, and feedback loops. One of the strengths of both Brethower’s TPS diagram and Rummler and Brache’s Super-system Map, is the application of these models at any level of
organization performance. Eickhoff (1991) suggests that the TPS can first be applied to the organization-wide level of vantage, and then be applied to each of the sub-levels of the organization down to the individual performer. Similarly, Rummler and Brache (1995) apply the Super-system Map to the Organizational, Process, and Job-performer levels of performance. Brethower (1982) explains that diagramming the various layers of an organization in this format will help managers understand how their part of the organization relates to other parts, and also how all of the parts contribute to the overall mission. Another strength of both models is that they provide a framework for understanding and improving organizational performance. Rummler and Brache (1995) point out, “Understanding performance requires documenting the inputs, processes, outputs, and customers that constitute a business” (p.13). They go on to note, “We find the ‘organizations as systems’ model useful because it enables us and our clients to understand the variables that influence performance and to adjust the variables so that performance is improved on a sustained basis” (p.14).

Feedback and Performance Improvement

At the core of both the TPS and the Super-System Map is the concept of feedback loops extending from both the processing and receiving systems respectively. As noted above, feedback from the processing system consists of information regarding the production of outputs (e.g., quality or cost of production), while the receiving system feedback consists of customers’ reactions to outputs received (e.g., complaints, new sales orders). In a much broader sense, both of these feedback loops can be said to provide useful feedback to the extent that they provide information which guides the performance of individuals (Brethower, 1972). In other words, the extent to which these feedback loops reach the processing system and affect the manner in which outputs are produced is critical to the survival and improvement of an organization.
Brethower and Wittkopp (1987) state, “Good information is essential because we need timely information if we are to manage the work and coordinate the efforts of the worker with the supporting efforts of the rest of the organization” (p. 87). Eickhoff (1991) explains that organizations which are performing at less than optimal levels may lack effective feedback from the processing and receiving systems, and that improving performance systems involves improving the frequency and accuracy of this information. Moreover, Brethower (1982) and Daniels (1994) explain that it is not sufficient to merely accumulate information about performance. This information must be used strategically to help groups and individuals enhance their performance. In other words, feedback must be incorporated into the management practices of an organization if it is to be useful in enhancing performance. In short, improving organizational performance is likely to involve systematic improvements in the type of feedback received and how that feedback is used.

There are multiple ways in which feedback can come to influence performance. Duncan and Bruwelheide (1986) use a behavior-analytic perspective to explain that feedback is a stimulus and as such can function as either an antecedent or a consequence for behaviors closely linked to performance. As an antecedent, feedback may function as a discriminative stimulus (SD) when it precedes behavior and alters the momentary frequency of that behavior. The feedback can be said to prompt or cue a response. This function develops by virtue of repeated pairings of the antecedent feedback with response-dependent consequences. Feedback may also function as an establishing operation by evoking behaviors which have been previously reinforced and/or altering the effectiveness of consequent stimuli (See Michael, 1982). As a consequence, feedback may function as a form of reinforcement when the provision of feedback follows a behavior and increases the future frequency of that behavior. The opposite is also true in that the presentation of feedback may function as a punisher.
when it follows a behavior and decreases the future frequency of that behavior. Finally, feedback can function as a form of conditioned reinforcement (or punishment). When the presentation of feedback is reliably paired with the delivery of reinforcement, the feedback alone may come to function as a form of reinforcement.

Based upon the analysis presented by Duncan and Bruwelheide (1986) feedback can affect behavior through either a stimulus control function or a reinforcement function. In the former case, feedback acts as an antecedent stimulus by signaling that a particular level of performance is more likely to be reinforced than some other level of performance. In the latter case, feedback may function as a delayed form of reinforcement for desired performance. Authors such as Balcazar, Hopkins, and Suarez (1986), Krapfl and Gasporotto (1982), Nordstrom, Lorenzi, and Hall (1990), Peterson (1982), and Prue and Fairbank (1981) provide similar analyses of the multiple stimulus functions of feedback.

Balcazar et al. (1986) reviewed 126 studies involving applications of feedback in organizations. They scored each study according to the consistency of the effects reported such that studies were deemed to have consistent, mixed, or no effects. Additionally, the researchers examined the extent to which several feedback characteristics such as source, privacy, participants, content, mechanism, and frequency of presentation were associated with consistent effects. They found that the most consistently effective feedback tended to be (a) delivered by managers/supervisors (b) in the form of graphs or charts, and (c) on a daily or weekly basis. In addition to identifying the characteristics associated with effective feedback interventions, Balcazar et al. (1986) also establish four combinations of feedback which have been used to improve performance: (1) Feedback alone, (2) feedback and goal setting, (3) feedback and consequences, and (4) feedback, goals, and consequences.
Feedback Alone

Feedback alone is simply the presentation of performance data by itself—that is, not used in combination with other tactics such as goal setting or consequences. This arrangement is characterized by the presentation of information regarding the quantity or quality of performance. Balcazar et al. (1986) found that of the 126 studies reviewed, 47 employed an intervention classified as feedback alone. Furthermore, they found that feedback alone produced the lowest level of consistent effects (28%), and the largest proportion of no effects (15%) and mixed effects (57%). Similar results were obtained by Nordstrom et al. (1990) in a review of publicly posted feedback. In this review the authors found that feedback-alone yielded generally positive albeit mixed effects.

Several studies following the Balcazar et al. (1986) and Nordstrom et al. (1990) reviews have demonstrated the effectiveness of feedback-alone interventions. Fox and Sulzer-Azaroff (1989) used written, supervisory feedback in increasing the percentage of fire evacuation drills conducted by direct-care staff members at residential care facilities for developmentally-disabled residents. Hawkins, Burgio, Langford, and Engel (1992) examined the effects of written and verbal supervisory praise upon the performance of nursing assistants' completion of assigned tasks in a nursing home. Henry and Redmon (1990) used written supervisory feedback to improve the implementation of a Statistical Process Control (SPC) program in a small machine shop. A study by Wittkopp, Rowan, and Poling (1990) evaluated the effectiveness of a feedback intervention in reducing the machine set-up time at a rubber manufacturing plant. And finally, Karan and Kopelman (1986) investigated the effects of feedback in reducing vehicular accidents within a package delivery company. In this study, the
researchers posted large signs displaying the number of vehicular accidents to date, as well as the number of accidents recorded at the same time from the previous year.

Feedback and Goal Setting

Another strategy for using feedback is to combine it with goal setting, in which performance targets are specified and individuals receive information on their performance relative to those targets. Fellner and Sulzer-Azaroff (1984) define the practice of goal setting as, "...specifying a level of performance toward which the individual or group should work" (p. 33). In a very broad sense, goal setting involves establishing a desirable level of performance (at the group or individual level) and tracking current performance levels with respect to this standard (See Fellner & Sulzer-Azaroff, 1984; Latham & Yukl, 1975). Several authors (i.e., Fellner & Sulzer-Azaroff, 1984; Latham & Yukl, 1975; Locke, Saari, Shaw, & Latham, 1981; Mento, Steel, & Karren, 1987) have noted that effective goal setting involves goals which are specific, challenging, and attainable. Additionally, setting goals should include input from employees and should be established relative to baseline performance.

Balcazar et al. (1986) found that 15 of the 126 feedback studies they reviewed investigated some combination of feedback and goal setting. Of these 15 studies, 8 (53%) were found to yield consistent effects and 7 (47%) yielded mixed effects. Nordstrom et al. (1990) reviewed two studies which combined feedback and goal setting and found that both reported interventions that effectively improved performance.

Multiple studies after the reviews by Balcazar et al. (1986) and Nordstrom et al. (1990) used a combination of feedback and goal setting to improve organizational performance. Ralis and O'Brien (1986) used a goal setting and feedback procedure to increase suggestive selling by wait-staff in a large suburban restaurant. Fellner and
Sulzer-Azaroff (1985) investigated the relative effectiveness of assigned versus participative goal setting in increasing the percentage of safe practices and non-hazardous working conditions at a large paper mill. Calpin, Edelstein, and Redmon (1988) assessed the effectiveness of feedback and goal setting in increasing the proportion of time that clinicians in a mental health center spent in direct contact with clients. In a large factory setting, Cooper, Phillips, Sutherland, and Makin (1994) used goal setting and feedback to increase the frequency of safe behaviors—thereby lowering job-related accidents. Finally, Wilk and Redmon (1990) studied the effectiveness of a daily-adjusted goal setting and feedback intervention within the admissions office of a university. In this study, the researchers implemented a system whereby the supervisor of operations set goals that specified the amount and type of work to be completed by admissions processors, and provided verbal and written feedback on their performance at the end of the day.

Feedback and Consequences

A third strategy involves combining performance feedback with behavioral consequences. In their review of feedback interventions Balcazar et al. (1986) characterize feedback and consequences as, "...studies in which participants received feedback and, additionally, events such as praise, time off work, lunch passes, and money were given following increases or decreases in the target behaviors" (p.69). The researchers identified 33 studies which combined feedback and consequences, of which 17 (52%) were associated with consistent effects, 14 (42%) with mixed effects, and 2 (6%) with no effects. The authors provided two fairly straightforward arguments why the combination of feedback and consequences is preferable to simply providing feedback alone. First, they explain that the provision of consequences, particularly reinforcing consequences, may result in improved performance by virtue of the
strengthening of behaviors critical to performance. Second, reinforcing consequences may serve to establish feedback as a form of conditioned reinforcement by virtue of repeated pairings.

Subsequent to the Balcazar et al. (1986) review, several researchers reported the results of interventions involving feedback and consequences. Allison, Silverstein, and Galante (1992) examined the effectiveness of three different incentive strategies in enhancing the effectiveness of a performance feedback system. In this study, the researchers obtained modest improvements in the percentage of key behaviors performed by teacher assistants during treatment sessions with handicapped children. A study conducted by Gaetani, Hoxeng, and Austin (1985) reported the effectiveness of a combination of feedback and incentives in increasing the proficiency of mechanics in an auto repair shop. Johnson (1985) used graphic feedback and lottery tickets (as reinforcers) to improve the inventory and stocking practices of circulation directors at a daily newspaper. Kortick and O'Brien (1996) reported the results of a unique intervention in which feedback and reinforcement were incorporated into a performance improvement contest between two shipping crews at a package delivery company. Each crew would be awarded points based upon it’s performance on an index of quality control measures. Their total number of points were posted as part of a simulated baseball game in which they competed against the score of the other crew. Finally, LaMere, Dickinson, Henry, Henry, and Poling (1996) used combinations of feedback and consequences to improve the performance, safety, and satisfaction of truck drivers for a waste disposal company.

**Feedback, Goal Setting, and Consequences**

The last strategy for using feedback is in combination with goal setting and behavioral consequences. This strategy incorporates all of the features described above
into a single approach. Balcazar et al. (1986) found that 19 of the 126 studies they reviewed were of this variety and that 9 (47%) were found to be associated with consistent effects, 8 (42%) with mixed effects, and 2 (11%) with no effects. Nordstrom et al. (1990) identified 8 studies which combined feedback, goals, and consequences and found that all of the interventions reported in these studies yielded consistent effects.

Based upon their review of feedback applications, Balcazar et al. (1986) conclude that the most effective interventions combine feedback with some system of differential consequences. Similar arguments are posited by other authors such as Calpin et al. (1988) and Fellner and Sulzer-Azaroff (1984). These authors argue that for feedback to be optimally effective it must be used in combination with differential consequences—that is consequences provided dependent upon desired performance. Nordstrom et al. (1990) extend this argument when they assert, “Combining the three conditions—public posting, goal setting, and reinforcement—appears to have created a strong positive effect. The presence of three explicit behavioral conditions appears to be superior to simply using only one or two of the three conditions” (p. 113). These authors argue that the ideal feedback intervention involves some combination of feedback with goals and consequences.

The advantage of combining feedback, goals, and consequences is that they complete a three-part model of performance known as an ABC Model (Daniels, 1994). In short, the “A” represents antecedents, “B” represents behavior, and “C” stands for consequences. Daniels (1994) explains that behavior in the workplace (or otherwise) can be understood using this model. An antecedent stimulus (A) precedes a behavior (B). A consequence (C) follows behavior and either increases or decreases the likelihood of that behavior occurring in the future. Furthermore, if an antecedent precedes a behavior which is reliably reinforced by a consequence, not only will the
behavior occur more frequently in the future, but the antecedent will become a
discriminative stimulus for that behavior. That is, it will evoke or prompt the behavior
that has been reinforced.

Fellner and Sulzer-Azaroff (1984) explain that goals can function as antecedents
for desired performance. They may serve to prompt or cue the behaviors that comprise
performance. Balcazar et al. (1986) and Duncan and Bruwelheide (1986) explain that
one of the functions of feedback is that of conditioned reinforcer. If the presentation of
performance feedback is reliably paired with an established reinforcing consequence,
then the feedback alone may serve to reinforce desired performance. To sum up, goals
can function as the “A” in ABC. They evoke desired behaviors (B) which are then
followed by feedback and reinforcement (C). After multiple repetitions of the
sequence, the goals themselves may function as a discriminative stimulus for the
desired behaviors. Indeed, this is the point Calpin et al. (1988) make when they state,

In an organization that has a history of providing differential reinforcement for
response to instructions from administration/supervisors, goals alone might be
effective in changing behavior because they predict differential outcomes.
However, if a history of lack of response to performance patterns is present,
goal statements would probably have little or no effect. (p.56)

In short, the combination of feedback, goals, and consequences is a promising
approach to performance improvement because it accounts for the antecedents and
consequences necessary to maintain the critical behaviors linked to performance.

Several studies subsequent to the reviews by Balcazar et al. (1986) and
Nordstrom et al. (1990) provide nice examples of combinations of feedback, goal
setting, and consequences. Pritchard, Jones, Roth, Stuebing, and Ekeberg (1988)
conducted a study across five organizational units at an Air Force base in the United
States. The researchers were interested in improving the overall effectiveness of the
staff in each unit. Effectiveness was a composite score developed by the researchers
using a tool called ProMes which is a weighted accounting system for measures of
productivity and quality. In this study, the researchers introduced a performance improvement package consisting of four phases: (1) baseline, (2) feedback, (3) goals, and (4) incentives. Feedback consisted of monthly feedback graphs, posted by the unit supervisor, displaying ProMes scores. Goal setting involved the researchers working with the staff at each site to develop attainable and challenging goals for improving effectiveness scores. Incentives consisted of staff receiving either a 1/2-day or full-day off from work, depending upon the effectiveness score achieved for that month. Following a five-month baseline, the researchers introduced the remaining phases in five-month periods. Additionally, the preceding phase remained in effect while the subsequent phases were introduced so that during the final phase an intervention consisting of feedback, goals, and incentives was in place.

The researchers found that the performance improvement package had a profound effect upon effectiveness scores. During the feedback phase, scores rose 50% over baseline. When goal setting was added to feedback, scores increased to 75% above baseline and when incentives were added to both feedback and goals effectiveness scores rose to 76% above baseline.

A study by Sulzer-Azaroff, Loafman, Merante, and Hlavacek (1990) used an intervention package consisting of feedback, goals, and incentives to improve the occupational safety at a large manufacturing plant. In this study, the intervention was applied across the three departments with the highest percentage of reported accidents from previous years. The dependent measure for the study was the percentage of safe behaviors/conditions observed (e.g., wearing safety glasses, steel-toed shoes) within each of the three units. Following a “kick-off” meeting in which the researchers reviewed examples of safety achievements (examples of safe behaviors/conditions) with employees, a target percentage of safety achievements was established for each unit. Every week employees received feedback from unit managers in the form of
graphs which displayed the percentage of safe occurrences observed. Managers delivering the feedback were instructed to provide verbal praise for progress toward a goal or goal attainment. Low-cost tangible incentives were provided upon goal attainment and if safety performance reached 100% a large celebration was held for that unit. The researchers found that the intervention resulted in a significant improvement in safe behaviors across all units. On average, each unit improved from a baseline level of 70% safety occurrences to 100% (for two units) and 85% for one unit. Additionally, the researchers found that the intervention resulted in the best year in company history in terms of reducing the percentage of on-the-job injuries, reducing recordable incidents by 40% and lost time accidents by 93%.

Pollack, Fleming, and Sulzer-Azaroff (1994) implemented a performance improvement package consisting of feedback, goals, and incentives at a residential facility for persons with developmental disabilities. In this study, the researchers were interested in improving the performance of 40 direct-care staff divided into 4 groups. The performance of interest was the goal setting behavior of direct-care staff. Participants were instructed to set personal performance goals which would be reviewed at two-week intervals. The researchers stipulated that performance goals be observable and quantifiable—for example conducting assessments, preparing programmatic plans, designing training plans, etc. Each group would meet every two weeks with their direct supervisor and the researchers to discuss their progress toward their established goals for that two-week period. Upon attainment of the goal, participants were required to either extend that goal or establish a new one. During the bi-weekly meetings participants received verbal praise from other participants as well as the supervisor and/or the researchers, on progress made toward attaining a goal. Additionally, the entire group would view a graph which displayed the number of goals set by the group, and the number of goals achieved. Both the number of goals attained...
and the percentage of goals attained increased for all four groups throughout the two-year duration of the study. At the conclusion of the study, all four groups had attained more than 1800 individual performance goals related to providing service to residential clients.

A study by LaFleur and Hyten (1995) examined the effectiveness of a combination of feedback, goals, and incentives in improving the performance of hotel banquet staff. The performance of interest was complete and accurate set-up of banquet rooms for meetings. The researchers developed a checklist of 14 different items (e.g., plates, water pitchers) that should be included in an accurate and complete set-up for a banquet. The dependent measure for the study was the number of checklists completed. The participants received daily feedback in the form of a large graph posted in their office. The graph displayed the percentage of room set-ups completed accurately. Goal setting consisted of hotel management establishing a target of 85% of all set-ups done completely and accurately. A monetary incentive of $10 per month was provided to each staff member if they attained the 85% set-up completion goal for that month. The researchers used an ABAB reversal design to evaluate the effectiveness of their treatment package, where “A” represented the baseline conditions and “B” represented the intervention conditions. They found that performance rose from a baseline average of 68% completion to 100% during the first intervention; and from a second baseline average of 89% to 100% during the second intervention phase.

In different ways, each of the studies reviewed above exemplifies the characteristics of effective feedback interventions as established by authors such as Balcazar et al. (1986), Daniels (1994), Fellner and Sulzer-Azaroff (1984), and Nordstrom et al. (1990). First, each of these studies includes performance feedback which is (a) delivered by managers/supervisors (b) in the form of graphs or charts, and (c) on a daily or weekly basis. Additionally, they involved goals which were specific,
challenging, and attainable, as well as established relative to baseline and at least partially developed by the participants in the intervention. Finally, each of the interventions described above incorporated some form of reinforcing consequence including tangible, verbal, and monetary reinforcers.

**Feedback Interventions in Small Business Settings**

Although the studies reviewed above provide considerable evidence in support of combinations of feedback, goals, and consequences, very few researchers have applied this approach in small business settings. Authors such as Ralis and O'Brien (1986), Henry and Redmon (1990), and LaMere et al. (1996) have employed other variations of feedback (e.g., feedback alone, feedback and goal setting) in small business settings, but only a few examples of feedback, goals, and consequences in small businesses are available.

One such study conducted by Johnson and Masotti (1990), used a combination of feedback, goals, and consequences to increase suggestive selling by waitstaff in a restaurant. In this study, the participants were six waitresses and waiters at a family-style restaurant. The researchers were interested in increasing the sales volume of items such as cocktails, appetizers, and desserts. The dependent variable was the percentage of sales tickets including the sale of the aforementioned items. The goal setting component consisted of the restaurant manager meeting with all of the servers and establishing a goal for each of the targeted items, such that 45% of all orders included cocktails, 25% for appetizers, and 12% for desserts. The feedback component consisted of the manager meeting every three days with the servers and providing verbal and graphic feedback on the percentage of orders including the targeted items. Finally, consequences were verbal and tangible. The manager provided verbal praise
upon goal attainment and small tangible reinforcers such as movie tickets or bowling coupons were provided as well.

The intervention was implemented in a multiple-baseline fashion across the targeted sales items. The results of the intervention revealed modest improvements across each of the sales items. Cocktails improved 8% over baseline, appetizers improved 27%, and desserts improved by 100%; however, baseline data revealed desserts sales occurred on only 4% of sales tickets.

Austin, Kessler, Riccobono, and Bailey (1996) conducted a pair of studies in which a combination of feedback, goals, and incentives was used to lower daily labor costs and increase the frequency of safe behaviors of workers on a roofing crew. In the first study, the dependent measure was actual labor costs as a percentage of estimated labor costs. The intervention consisted of a multi-component package that included goal setting, the delivery of small tangible incentives (e.g., soft drinks), performance contingent lunches, daily feedback, and cash incentives. At the beginning of each day, a series of performance goals were established for each member of the 7-person work crew. The performance goals varied across individuals and days; however, they always involved finishing some task ahead of schedule and under budget. Upon attainment of these goals, individuals would receive small tangible reinforcers such as soft drinks. Additionally, if the crew accumulated three consecutive days in which they performed under budget, the performance manager would take the crew out to lunch. On a daily basis, the crew reviewed a performance feedback chart which chronicled the amount of dollars saved to date, the amount of time spent on the project, daily attendance, and incentive amounts earned. Finally, 40% of the total savings for each day was distributed on a weekly basis among the crew members in the form of monetary incentives.
The researchers found that this multi-component intervention was effective in reducing the daily labor costs for the work crew. The mean labor cost prior to the intervention was 141% of the estimated labor bid. During the intervention the mean labor cost dropped to 81% of the estimated labor cost projected in the original bid. As a whole, the crew was able to reduce labor costs by $9,368 for 26 days of work on a single project.

In the second study, the researchers worked with the same roofing crew as the first study; however, the target for this intervention was the safe behaviors of the crew. The intervention again consisted of a combination of feedback, goals, and incentives. The researchers developed a checklist of safe behaviors (e.g., wearing safety glasses) which was used to make daily observations. The dependent measure for this study was the percentage of safe behaviors on the checklist that were observed to be occurring during observations sessions. A safe-behavior target of 80% was established for the work crew. For each day that the crew achieved an 80% (or better) score on the percentage of safe behaviors exhibited (both “on the ground” and “on the roof”), each crew member would accrue 0.5 hours of paid time-off to be used at the conclusion of the project. Furthermore, daily feedback was provided by plotting both the percentage of safe behaviors observed and the number of paid time-off accrued by each crew member.

The results from this second study were promising. The percentage of safe behaviors occurring “on the ground” rose from 51% during baseline to 90% during the intervention. Likewise, the percentage of safe behaviors occurring “on the roof” rose from 55% during baseline to 95% during intervention.

Aside from simply demonstrating the viability of combinations of feedback, goals, and consequences in small business environments, the studies described by Johnson and Masotti (1990) and Austin et al. (1996) provide good examples of
interventions which impacted the bottom-line of the business. Johnson and Masotti (1990) estimated that restaurant sales were bolstered by $1,260 and individual server tips by $189 during a one-month period. Austin et al. (1996) reported labor cost savings of $9,368 and estimated that the probability of preventable injuries on the job had been reduced dramatically—-injuries that cost the organization approximately $50,000 apiece. In short, the interventions described above can be said to make sense from a business perspective.

Summary

Small businesses comprise a large proportion of business revenues (47%) in the United States, as well as a large proportion of the employment (53%). Furthermore, the prospects for the continued growth and development of the small business market appear to be quite promising. While the prospects for small business opportunities appear to be quite good, the challenges facing the owners and managers of small enterprises can be daunting. In particular small business owners are not only required to tend to the financial performance of the firm, but they typically are required to attend to the daily operations and performance of the company as well. Managing both the finances and daily operations of a firm requires the owner-manager to collect and understand a great deal of information and use that information to ensure that bills are paid, work is completed, and new business is generated. However, Bauce (1969) and Carbone (1980) note that a common mistake made by the owner-managers of small firms is a lack of emphasis on performance measures such as sales, profits, and debts and a high degree of emphasis on available cash.

The Balanced Scorecard (BSC) approach represents a system for measuring business performance that allows managers to focus on a handful of key indicators in a balanced format. In terms of the organizational models described by Brethower (1982)
and Rummler and Brache (1995), the BSC approach provides internal and external feedback. While this feedback may be important, it may not truly be useful until it is used to affect operations in the processing system. As is, the BSC provides little guidance on how to use the scorecard data to strategically improve performance. However, authors such as Balcazar et al. (1986), Calpin et al. (1988), and Nordstrom et al. (1990) explain, that feedback (such as BSC data) can be used effectively to improve performance when it is combined with goal setting and consequences. Duncan and Bruwelheide (1986) explain that feedback can function as a discriminative stimulus in prompting desired performance, or as a form of delayed reinforcement when it follows desired performance and increases the future likelihood of that performance. In terms of a small business setting, feedback can function as a prompt to engage in certain behaviors associated with improved performance, or it can function as a form of delayed reinforcement for those same behaviors that together comprise desired performance.

To date, no studies could be located that have attempted to combine feedback in the BSC format with goal setting and consequences. Moreover, no studies could be located that have examined the effectiveness of a combination of feedback, goal setting, and consequences across multiple small businesses. A reasonable extension to the studies of feedback reviewed above is to combine feedback generated using a BSC format, with goals and consequences. Moreover, this combination could be used with multiple small businesses.

Aside from extending the literature on feedback, developing and testing viable feedback interventions across multiple small businesses is a reasonable notion for two reasons. First, many small business owners receive funding through banks or commercial lenders. Certainly, developing business improvement strategies holds value for the business owners; however, commercial lenders can also benefit from
effective strategies for small business success through improved return-on-investment (ROI). Second, many small business owners purchase materials from suppliers. From the suppliers' perspective it is worthwhile for their customers—the small businesses—to perform well and purchase more merchandise. In short, while studies such as those contributed by Johnson and Masotti (1990) and Austin et al. (1996) have demonstrated the effectiveness of combining feedback, goals, and consequences in small business settings, a reasonable extension of this methodology is to apply it across a series of small businesses.

Purpose

The purpose of this study was to examine the effectiveness of an intervention consisting of feedback, goals, and consequences in improving the performance of four small businesses. The feedback provided to participants in this study was intended to serve two functions: a discriminative stimulus function and a reinforcement function (Duncan & Bruwelheide, 1986). In the former case, the performance feedback provided to participants would alter the momentary frequency of behaviors associated with key performance variables. In other words, the feedback was intended to prompt or cue behaviors related to key performance measures. With respect to the latter function, the feedback was intended to function as a form of delayed reinforcement for those behaviors associated with key performance. In terms of Brethower's (1972) TPS Diagram and Rummler and Brache's (1995) Super-system Map, the intervention was an attempt to establish internal and external feedback loops that alter the frequency of those behaviors involved in producing specific accomplishments.
CHAPTER II

METHODS

Participants and Setting

The participants in this study were four small businesses located in the eastern United States and Canada. Each of the businesses specialized in chimney restoration on residential and commercial structures. This specialized service involves re-lining the inner flue of the chimney with a liquefied mix that dries and hardens. Once the mix has solidified, the flue has been properly restored and the chimney can once again be used to release heat and smoke from the structure. Each of these businesses purchased mix and equipment for chimney restoration from a supplier located in the midwestern U.S. This supplier also holds the patent on the re-lining process as well as the mix itself. All of the businesses in this study were contractually bound to purchase mix only from this supplier.

The participants in this study were selected on the basis of the amount of mix they had historically purchased from the supplier. On average, the chimney restoration companies purchasing from this supplier buy approximately $11,700 of mix or 450 bags per year. The owner of the supply company identified ten businesses which had historically purchased fewer than $11,700 or 450 bags per year. These businesses were selected because they were believed to have the potential to improve their performance. Additionally, the supplier was interested in developing and testing a performance improvement strategy for customers performing below average levels—that is, purchasing fewer than 450 bags of mix each year. Because of the exclusivity of the business relationship with each of the customers, the supplier was certain that by
finding ways to improve the business performance of each customer, they would in
turn purchase greater quantities of mix and equipment, thereby improving the business
performance of the supplier as well. Each of the targeted companies was sent a letter
from the supplier (See Appendix A) explaining the availability of a feedback program in
which they could participate voluntarily. Each letter was also accompanied by a
telephone call from the supplier further explaining the program and encouraging their
participation. Four of the ten companies—referred to as Companies #1, #2, #3, and #4
volunteered to participate in the program.

Company #1 is a chimney-sweep service owned and managed by one individual
who works with one employee to offer chimney restoration services. The chimney
sweep service was established prior to the introduction of the chimney restoration
service which began in January of 1996. Company #1 serves residential and
commercial property-owners in the North Carolina area.

Company #2 is also a chimney-sweep business which later added chimney
restoration as a service in February of 1995. The company is owned by one individual
who also holds a full-time job as a firefighter. In addition to the owner, three other
employees operate both the chimney sweeping and restoration services on a full-time
basis in the state of Virginia.

Company #3 is a business dedicated to chimney restoration. This business was
started by the owner in June of 1996, who purchased the company from his business
partner. The owner operates the business with two other individuals in northeastern
Canada.

Company #4 is owned and operated by a husband and wife in the state of
Maryland. The owners added chimney restoration to their general contracting business
in June of 1996. In addition to the owners, two other employees assist with both
general contracting as well as chimney restoration.
The setting for the study was the office of the supplier located in the midwestern United States. The office was run by three individuals including the owner. Their office was located inside of a warehouse which contained all of the mix, equipment, and materials sold to individual companies. At the time of this study, the supplier provided mix and equipment to 44 other contractors in addition to the participants. All purchases, billing, shipping, and communication with the individual chimney restoration companies (i.e., the supplier’s customers) were conducted through this office.

The primary apparatus used in this study was a computer software program called Feedbacker©, which was designed specifically for use by the supplier. At the time of the study, 12 of the supplier’s customers (not including the four participants in this study) participated in a weekly feedback program using this software to convert data from each company into graphic format. This program will be described in more detail below.

Dependent Variables

There were four dependent variables (DV) for this study: (1) Number of marketing contacts made, (2) number of estimates written, (3) amount of work produced in dollars, and (4) amount of backlog work in dollars. Marketing contacts were defined as any face-to-face meeting between the owner/manager of the business and a potential customer. Potential customers included insurance adjusters who may contact restoration specialists when chimney repair work is needed, as well as commercial or residential customers in need of chimney restoration. Written estimates were operationalized as those occasions where the owner/manager of the business met with a potential customer, inspected the chimney to be restored, and provided a detailed
written assessment of the work to be completed and projected cost. Work produced reflected the number of dollars billed to customers for completed work each week. Work in backlog was identified by summing the total dollar value of all projects (either on-going or not yet started) that had been scheduled for future work.

Data were collected on a weekly basis from each of the participating companies. Each company would fax a copy of a weekly data form (See Appendix B) which contained the data for each of the four dependent measures. Additionally, the participants were required to send verification of marketing contacts. These contacts could be verified by including a copy of either the business card or name and address of the contact. If verification of the marketing contacts was not provided, the contacts were not counted toward the weekly goal.

In addition to the dependent measures mentioned above, other qualitative and quantitative data were collected as well. The number of bags of mix (and equipment) purchased from the supplier was collected in an effort to track the impact of the intervention package upon the supplier as well as his customers. These data were collected by viewing weekly sales orders placed with the supplier. Additionally, data were collected on the number of times each of the participants qualified for the incentive package which is described in the next section. Finally, qualitative data were collected on any significant changes affecting the business practices of each participant. For example, if a company suspended operations temporarily while relocating the business, this information was noted and the potential impact of such a change upon the dependent measures was assessed.

Independent Variable

The independent variable (IV) for this study was an intervention consisting of a combination of feedback, goals, and incentives. The feedback component consisted of
the graphic representation of performance data, which was faxed to participants on a weekly basis (See Figure 3). This feedback displayed the data for the most recent 13 weeks for each of the dependent measures. Each graph contained a horizontal line across the length of the display. This line was referred to as standard or the target line for performance. This line represented the goal-setting aspect of the study which will be described in detail below. Finally, incentives consisted of two levels of price discounts awarded contingent upon the number of times the standard (goal) line of performance was met or exceeded for each dependent measure. If the standard line was exceeded at least 13 times across all dependent measures, the participant would be eligible for a $0.50/bag discount provided they purchased mix within the following week. If the standard line was met or exceeded on at least 33 occasions, the participant was eligible for a discount of at least $1.00/bag on the purchase of mix within the next week. The IV was implemented as a package, that is, during the intervention all three conditions described above were in effect simultaneously.

Procedure

During the baseline condition participants were required to fax copies of weekly data sheets to the supplier on either Friday afternoon or Monday morning of the subsequent week. Also, subjects were required to send copies of either business cards or names and addresses of marketing contacts. Performance data were entered into the Feedbacker© program by the supplier; however, no feedback graphs were forwarded to the subject; no goal setting occurred, and no discounts/incentives were made available contingent upon performance. However, to ensure that participants were sending data each week, a discount of $0.25/bag was offered for purchases of mix contingent upon the participant faxing data sheets to the supplier each week. If a participant failed to send data for a particular week, the supplier telephoned and requested the data. If the
Figure 3. Sample Feedback Graph From the Feedbacker© Program.
data were still not sent, no discount was allowed for that participant for that week.

One week prior to the beginning of the intervention phase, the supplier faxed a sample copy of the feedback graphs (Figure 3) to the subject and described the feedback, goal setting, and incentive program during a subsequent telephone call. Additionally, the supplier discussed the characteristics of good goal setting with each participant—in particular the fact that good goals are challenging, attainable, and determined with the help of the performer. Using a goal setting worksheet (Appendix C) the supplier and each participant established performance goals for each of the dependent measures in this study. The supplier required that each goal be based upon at least a 10% improvement in the total number of bags purchased per year. To determine the respective goal-value for each dependent measure, the supplier used the formula shown in Table 1 as a guideline for establishing performance goals with each participant. Table 1 also includes sample data written in italics. The items in the “Resultant Figure” column appearing in bold text represent the goals for each dependent measure in the current study. Finally, the supplier informed the participant that if they chose to participate in the intervention, they would no longer be eligible for the $0.25/bag discount for submitting weekly data sheets.

As noted above, the supplier worked with each participant to set performance goals that were specific, challenging, and attainable. Table 2 provides the goals established for each company across each dependent variable. The goals established for each participant deviate from the guidelines established by the supplier. These deviations reflect the wishes of the individual participants in setting performance targets.

During the intervention, each company recorded data on a worksheet (See Appendix C) and faxed the information to the supplier on a weekly basis. Additionally,
Table 1

Guidelines for Goal Setting

<table>
<thead>
<tr>
<th>Formula</th>
<th>Resultant Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of jobs completed in last 12 months X Retail price per job* = 21 X $2,500* =</td>
<td>Yearly volume $53,333</td>
</tr>
<tr>
<td>Yearly volume X 1.1 = $53,333 X 1.1 =</td>
<td>Yearly volume goal $58,667</td>
</tr>
<tr>
<td>Yearly volume goal / 52 weeks = $58,667 / 52 weeks =</td>
<td>Weekly production goal $1,128</td>
</tr>
<tr>
<td>Weekly production goal X 6 weeks = $1,128 X 6 weeks =</td>
<td>Weekly backlog goal $6,768</td>
</tr>
<tr>
<td>Yearly volume goal / Retail price per job* = $58,667 / $2,500* =</td>
<td>Yearly jobs completed goal 24</td>
</tr>
<tr>
<td>Yearly jobs completed X 2.0** = 24 X 2.0** =</td>
<td>Yearly estimates written goal 48</td>
</tr>
<tr>
<td>Yearly estimates written goal / 52 weeks = 48 / 52 weeks =</td>
<td>Weekly estimates written goal 1.0</td>
</tr>
<tr>
<td>Weekly estimates written goal X 5.0 = 1.0 X 5.0 =</td>
<td>Weekly marketing contacts goal 5.0</td>
</tr>
</tbody>
</table>

* Assumes a retail price per job of $2,500
** Assumes a sales closure rate of 50%

Each participant was asked to verify marketing contacts by photocopying either the business card and/or name and address of each contact, and faxing this information along with the data sheet. If verification of the marketing contacts was absent, the supplier telephoned the participant and requested the verification. If the verification was not sent the marketing contacts were not counted toward the goal for that week.

The supplier would then enter information from each company's data sheet into a...
Table 2
Goals Established for Each Participant

<table>
<thead>
<tr>
<th></th>
<th>Marketing Contacts</th>
<th>Estimates</th>
<th>Work Produced</th>
<th>Work Backlog</th>
</tr>
</thead>
<tbody>
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<td>Company #1</td>
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<td>$4,000</td>
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</tr>
<tr>
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<td>1.0</td>
<td>$1,128</td>
<td>$6,768</td>
</tr>
<tr>
<td>Company #4</td>
<td>15.0</td>
<td>3.0</td>
<td>$3,000</td>
<td>$37,500</td>
</tr>
</tbody>
</table>

computer software program called Feedbacker© which placed the data into graphic format. The Feedbacker© system is arranged much like the Balanced Scorecard system developed by Kaplan and Norton (1992), in that a few key business performance indicators are identified and tracked rather than several different measures of performance. Additionally, the Feedbacker© system produces graphic representations of business performance data consolidated into four critical areas. Whereas the BSC approach narrows performance measures into the categories of financial, customer service, internal processes, and innovation; the Feedbacker© system narrows performance into marketing contacts, estimates written, work produced, and work backlog. The output of the Feedbacker© system is a series of four graphs which display the most recent 13 weeks of performance in each of the four measurement areas (See Figure 3). These graphs were then faxed back to each participant. The feedback graphs display a total of 52 opportunities (4 different measures x 13 weeks per measure = 52 opportunities) to meet or surpass the performance goal. If the goal was met or surpassed on at least 13 occasions, the subject was eligible for an incentive for the following week. This incentive consisted
of a $0.50/bag discount on purchases of mix. If at least 33 goals were met or surpassed, the participant was eligible for a discount of $1.00 per bag. However, all participants were informed that they must purchase mix within one week of the date on the feedback graph for a particular discount to be available. This requirement was included to prevent participants from hoarding or saving discounts for use at a later time.

An example will help illustrate this procedure. The feedback graph displayed in Figure 3 shows that the goal line was met or surpassed on 27 occasions. In this case, the company has qualified for a first-level incentive of $0.50/bag purchased. If the company chooses to purchase mix within the next week, it will save $0.50 on every bag. If this company had met or surpassed the standard line on 33 occasions, it would have qualified for a second-level discount of $1.00/bag purchased.

Experimental Design

The design used in this study was a multiple baseline across companies. A multiple baseline design is essentially a series of AB-type interventions where the ‘A’ represents a baseline phase and the ‘B’ represents the intervention. The distinguishing feature of a multiple baseline design is the fact that the intervention phase is staggered across all subjects so that no two subjects begin the intervention at the same time (Barlow & Hersen, 1984; Kazdin, 1982). While subject 1 begins the intervention phase, the remaining subjects stay in the baseline condition. After several data points, subject two also moves into the intervention phase, while subjects 3, 4, 5, etc., remain in baseline. The introduction of the intervention phase continues in this staggered fashion until all of the subjects have been exposed to the intervention phase. Barlow and Hersen (1984) explain that the independent variable can be said to be effective if changes in the dependent variable appear after the introduction of the intervention,
while the DVs remain unchanged for the subjects still in the baseline condition. These authors also explain that the use of a multiple baseline design is advisable in applied research in those cases where it would be unethical, impractical, or harmful to introduce reversal conditions.

Barlow and Hersen (1984) also note that there are certain conditions under which it is advisable or inadvisable to begin the intervention phase for a particular subject. In general, subjects should not be moved to the next phase in the study if upward or downward data trends are evident, or substantial variability is evident in the data. In the current study, every effort was made to initiate phase changes only if an upward trend in the data was not evident across each of the dependent measures.
CHAPTER III

RESULTS

On the basis of earlier studies in which feedback, goal setting, and consequences were combined as part of a package intervention, it was expected that the introduction of such a program with the small businesses in this study would yield improved performance. However, the combination of feedback, goal setting, and consequences yielded little or no improvement in the dependent measures for the four companies participating in this study. Companies #2 and #4 stopped submitting weekly performance data to the supplier very soon after the intervention phase had started. In general, the performance of Companies #1 and #3 appeared to be largely unaffected by the intervention.

At week 27 of the study, it was discovered that the intervention package was not implemented as intended for Company #3. In particular, the weekly feedback graphs did not reflect a standard line (goal line) on each of the four performance measures; although goals were established for this company. This omission amounts to a noteworthy variation in the independent variable for the study. While goals were set for all of the participants in this study, the goal setting for Company #3 was different than that for the other participants. The goal setting that occurred for Company #3 can best be described as verbal goal setting, while the goal arrangements for the other participants were reflected on their feedback graphs. Although this variation in the independent variable for Company #3 occurred, the data for this participant will be included with the data for all participants.
Three of the four participants (Company #2, #3, and #4) encountered significant events unrelated to the study, which impacted their consistency in submitting weekly data to the supplier, as well as their weekly business performance. At week 20 in the study the principal owner of Company #2 began the process of buying-out the former co-owner of the company—who also happened to be a family member. The principal owner of the company informed the supplier of this process and also indicated that the buy-out was very emotional, expensive, and time-consuming, and limited the amount of time he could devote to the business itself, as well as submitting weekly data sheets. Similarly, the owner of Company #3 attributes several weeks of missed data (weeks 12-15 and 21-23) to a buy-out process. The owner of Company #3 began the buy-out process following week 11 of the study; however, continued voluntary participation in the study. Company #4 began a company-wide relocation to new facilities which began during week 21 of the study. The owners of Company #4 and the supplier reported that this relocation was responsible for the cessation of data following week 21.

Marketing Contacts

In general the frequency remained quite low throughout the entire study, for three of the four companies. Company #1 (Figure 4) completed one contact during the baseline phase for a weekly average of 0.07 contacts, whereas during the intervention phase no contacts were recorded. A modest frequency of contacts was recorded for Company #2 during the baseline phase, yielding an average of 0.9 contacts per week and nearly all contacts (10 of 18) occurring within week 8. Unfortunately, Company #2 stopped sending data early into the intervention phase and only four data points were collected (weeks 19 and 20) for which no contacts were recorded. Company #3 yielded a modest improvement in performance increasing from one contact reported during the
Figure 4. Frequency of Marketing Contacts Completed.
baseline phase for a weekly average of 0.05, to a total of six during the intervention condition for a weekly average of 0.60. Company #4 completed a total of 97 marketing contacts during the baseline phase for a weekly average of 4.60; however, this company stopped sending data at the beginning of the intervention phase, so no data were available for this participant.

Estimates Written

Figure 5 displays the frequency of Estimates Written recorded for each company. Overall, a higher frequency was observed for Estimates Written compared to the frequency of Marketing Contacts. Company #1 maintained a fairly high rate of writing estimates during the baseline condition yielding a weekly average of 7.40; however, this rate decreased to an average of 4.3 per week during the intervention condition. Company #2 yielded a weekly average of 0.09 Estimates Written during the baseline condition and this average increased slightly to 1.0 per week during the four weeks in which this company submitted data during the intervention phase. An average of 0.68 estimates written per week was obtained for Company #3 during the baseline condition, and this average increased to 1.5 during the intervention phase with 9 of the 15 estimates written during this phase occurred during week 27. Company #4 engaged in a modest rate of estimate writing, completing 1.50 estimates per week; however, no intervention data are available for this participant.

Work Produced

Figure 6 displays the results for Work Produced for each of the companies in this study. Overall, the intervention had very little effect upon the volume of Work Produced across each of the companies, with the exception of Company #3 which showed some improvement over baseline. The results for Company #1 can best
Figure 5. Frequency of Estimates Written.
Figure 6. Volume of Work Produced.
be described as unaffected by the intervention. During the baseline condition, a weekly average of $3,299 in Work Produced was recorded for this company, and during the intervention phase this average decreased slightly to $3,046 per week. Weekly performance decreased for Company #2 as well. During baseline this participant attained a weekly average of $1,420; however, during the four weeks of the intervention phase, no production dollars were recorded. While the weekly average performance for Company #3 decreased from $5,362 during baseline to $1,348 during the intervention; the results obtained during the intervention represent an improvement when compared with the last 10 weeks of baseline data in which no work was produced. Finally, Company #4 produced an average of $1,369 per week during the baseline phase, however no intervention data are available for this participant.

Work Backlog

Figure 7 shows the results with respect to Work Backlog. For the most part there appears to be no relationship between the introduction of the intervention and any changes in the Work Backlog data. The results for Company #1 show that the level of backlog remained largely unaffected by the intervention. During the intervention the data remained near the baseline average of $12,021 with the exception of declines at weeks 17 and 18. At week 25, performance declined slightly and remained below baseline levels for the remainder of the study. The Work Backlog volume for Company #2 declined throughout the baseline phase until week 13 where the backlog volume began to increase from zero. This increase continued until the introduction of the intervention at week 16. During the intervention the results declined slightly; however, the average weekly backlog during this phase was $6,409 whereas the baseline phase yielded a weekly average of $5,362. The Work Backlog volume for Company #3 began at a comparatively high level of $33,000 and decreased throughout...
Figure 7. Volume of Work Backlog.
the baseline condition. Following an initial increase during the intervention condition (week 20), backlog remained low until a sharp increase at week 27 and then decreased for the remainder of the study. Work Backlog for Company #4 remained low throughout baseline with the exception of brief peaks at weeks 1 and 6. The average weekly performance for this company during baseline was $1,898.

Amount of Mix Purchased From Supplier

Figure 8 shows the number of bags of mix purchased from the supplier by each company during the period in which the study occurred. While the amount of mix purchased was not a primary dependent variable, these data were collected to provide information regarding the impact of the intervention on the critical business indicator for the supplier—materials sold. Company #1 purchased a total of 240 bags of mix during baseline, whereas during the intervention 320 bags of mix were purchased. Company #2 purchased 120 bags during the baseline phase, compared with 40 during the intervention. Company #3 did not purchase any mix during this study and Company #4 bought 80 bags of mix during the baseline phase.

Number of Price Discounts Attained

Table 3 displays number of opportunities each company had to receive either a Level 1 or Level 2 price discount on purchases of mix, as well as the number of times they actually took advantage of the discount. A Level 1 discount represented a savings of $0.50/bag on purchases of mix, while a Level 2 discount was a savings of $1.00/bag. A Level 1 discount was granted if a company achieved performance targets on at least 13 occasions, and a Level 2 discount if targets were met on at least 33 occasions. Of the four participants only Company #1 qualified for a discount (Level 1), doing so on 17 occasions. On four of those occasions Company #1 accessed the
Figure 8. Amount of Mix Purchased From Supplier.
discount, that is, they purchased mix and received the discount on their purchase. The other three participants did not qualify for any level of price discount.

Table 3

<table>
<thead>
<tr>
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<th>Accessed Level 1</th>
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<th>Accessed Level 2</th>
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<tr>
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CHAPTER IV

DISCUSSION

Characteristics of Independent Variable

At the beginning of this study, it was believed that a combination of feedback, goals, and consequences could improve the performance of four small businesses. In particular, it was believed that this combination could serve two functions: A discriminative stimulus (SD) function and a reinforcement function. With respect to the SD function, the sight of the goal line combined with the sight of the feedback graph relative to that goal could act to prompt the behaviors associated with making marketing contacts, writing estimates, producing work, or generating backlog. With respect to the reinforcement function, the sight of the performance graphs meeting or eclipsing the goal, combined with access to the price discount could function as forms of delayed reinforcement for the behaviors associated with each dependent measure. In short, it was believed that the package intervention used in this study would prompt or cue desired performance, as well as reinforce desired performance.

Studies by Johnson and Masotti (1990) and Austin et al. (1996) used combinations of feedback, goals, and consequences in small business settings and reported favorable outcomes. Based upon the results obtained in this study, it is not possible to conclude that the package intervention was effective in improving the performance of the small businesses participating. Two of the participants in the study (Company #2 and #4) provided very few data points during the intervention phase of the study. This paucity of data provides support for the conclusion that the intervention was not effective for these two participants. Company #1 and #3 provided several data
points during the intervention; however, the performance of Company #1 appeared to be unaffected by the intervention, whereas Company #3 showed only slight improvement near the conclusion of the study.

Because the intervention in this study consisted of a combination of feedback, goals, and incentives, it is not possible to determine if any particular element of the intervention was more or less effective than any other. It is, however, possible to analyze the characteristics of these elements and discuss how they may have contributed to the results obtained. The feedback component of the intervention incorporated the critical features of feedback interventions described by Balcazar et al. (1986). In particular, the performance feedback used here was presented in graphic form, on a weekly basis, and captured the relevant data with respect to the success of the business (marketing, estimates, work produced, and backlog). However Balcazar et al. (1986) and Calpin et al. (1988) also note that the effectiveness of feedback in improving performance is largely dependent on whether functional goals and consequences are present in the work environment. It may have been the case that the goals and incentives included with the feedback in the current intervention were not sufficient to make the feedback a functional antecedent or consequence for desired performance.

The performance goals set for each participant in this study reflect many of the characteristics of ideal goal setting as established by authors such as Fellner and Sulzer-Azaroff (1984), Latham and Yukl (1975), and Locke et al. (1981) — that is, goals should be challenging, attainable, based upon past performance, and participatory. Based upon the results obtained, it appears that the goals agreed upon with each participant were unattainable at the time of the study. As noted earlier, only one of the four participants, Company #1, attained the goals frequently enough to qualify for the price discount. One explanation for the low frequency of goal attainment could be that
the goals set for each performance measure were simply too high. Daniels (1989) notes that a common mistake made by performers given the opportunity to set their own performance goals is that they are too ambitious. In the current study, the supplier consulted with each participant in establishing reasonable performance goals with the condition that goals reflect at least a 10% improvement in performance. Additionally, the supplier reported that the performance targets established were reasonable given his experience with other customers participating in a separate feedback program. Each participant agreed that the targets selected were attainable and challenging. Based upon the results obtained, the goals established for each of the participants (with the exception of Company #1) appear to have been too ambitious.

A factor contributing to the lack of performance improvement was an unusually mild winter in the regions in which each participant is located. The National Climatic Data Center (NCDC) reported that temperatures from December to March in the eastern United States and Canada were significantly above average (Breuhas, 1998; Cooper & Madigan, 1998; NCDC Climatic Variations Bulletin, 1997, 1998). The impact upon chimney restoration business was detrimental. As residents use their chimneys less intensively, fewer chimneys are damaged and require repair. Hence mild winters result in less business for chimney restoration contractors. Given their experience in the industry, the participants and the supplier felt the goals were reasonable for typical business conditions; however, the mild winter resulted in business performance far below expectations.

An important point related to the infrequency of goal attainment, is that by not meeting goals on a regular basis participants encountered the planned consequence—price discounts, infrequently or not at all. As noted earlier, Company #1 was the only participant to qualify for and access the price discount, receiving a Level-1 discount of
$0.50/bag on four occasions. None of the participants qualified for a Level-2 discount of $1.00/bag. Because the planned consequences were rarely encountered, much of the participants’ performance occurred with undetermined consequences. In other words, while participants engaged in behavior aimed at getting desired results it is unclear whether or not those behaviors were reinforced in any fashion. One of the motivations for including discounts in the current package intervention was to ensure that feedback and goal setting was accompanied by desirable consequences—thereby strengthening the power of feedback and goals as antecedents and consequences. Authors such as Balcazar et al. (1986) and Calpin et al. (1988) have noted that the fundamental ingredient of effective feedback is its pairing with functional consequences. In the current study, few opportunities existed for this pairing between reinforcing consequences, feedback, and goals that may partially explain the results obtained.

The fact that the planned consequence was encountered infrequently could indicate that the requirements for qualifying may have been too difficult in several respects. First, participants were required to attain performance goals on 13 occasions out of 52 possible opportunities, in order to receive a Level-1 discount. While this condition only required participants to attain goals 25% of the time, the initial attempts to attain particular goals went unreinforced. Said differently, the participants may have been engaging in the desired behaviors but were unable to attain performance targets the requisite 13 times out of 52 opportunities. Hence, participants’ earliest attempts at goal attainment were unreinforced. In short, the conditions for accessing the planned reinforcer in this study were not amenable to shaping successive approximations toward the target performance.

Future researchers should consider employing a more intricate system of consequences that allows for initially low or modest performance to be reinforced.
Such an arrangement would be advantageous in that the performance of participants could be shaped in discreet steps toward successively higher goals. In the current study, very little flexibility for such shaping was possible as only two levels of incentives were available. On the other hand, intricate systems of consequences may not be advantageous in terms of practicality. One of the motivations for using the two-tiered arrangement in this study was simplicity for both the supplier and the participants. A highly detailed system of consequences may be regarded as too labor-intensive for practical application. Determining the level of incentive for which a participant qualified would require extra effort on the part of both the participant and the supplier, and in this respect may be an unappealing option for future applications. Certainly a balance must be achieved between the necessary flexibility for shaping performance and the practicality of implementing such a system.

A second factor that may have affected the frequency with which the consequence was accessed was the fact that participants were required to purchase mix to receive a discount. The difficulty this arrangement created is that the reinforcer was conditional not only upon goal attainment, but also upon the need for mix. Hence, participants could only access the intended reinforcer if they needed mix as well. Moreover, this arrangement makes the reinforcement of initial approximations toward desired performance less likely. In the event that a participant qualified for a discount early in the intervention phase, it would be unlikely that they would need a large quantity of mix immediately—thereby missing an opportunity for reinforcement although the desired performance occurred. Perhaps a more effective approach in future studies would be to allow participants to accumulate “points” which could later be redeemed for future discounts. Points could then be awarded any time goals were attained for a particular week. Moreover, higher point values could be awarded for
consecutive weeks of goal attainment. The disadvantage of a point system is that it requires additional effort on the part of the program administrator to tabulate and account for awarded points and redeemed points. Authors such as LaMere et al., (1996) and Kortick and O’Brien (1996) have described similar systems which have been shown to be not only effective, but relatively easy to maintain. No studies as yet have examined such a system in small business settings.

Two factors that may have influenced the results of this study are the delay of consequence delivery, and the reinforcing effectiveness of the planned consequences. With respect to the first issue, delay of consequence delivery, the current design did not allow for immediate delivery of the planned consequence. The price discounts that functioned as the intended reinforcers could only be accessed the week after the requisite goals had been attained. Also, the participants were required to accumulate at least 13 weeks of data to be eligible for a Level-1 discount—a requirement that contributed to the delay in consequence delivery. Authors such as Daniels (1994), Komaki (1986), and Michael (1993) explain that reinforcing consequences are most effective if they follow the desired behavior closely in time. Although the planned consequence was accessed on few occasions, it is not clear whether the delay in reinforcement affected the results in a meaningful way. Future studies of feedback, goal setting, and consequences should attempt to minimize the delay between goal attainment and consequence delivery. One strategy for overcoming this delay would be to notify the participants of their reward by telephone or Email.

At the beginning of the study it was believed that a reduction in price would be viewed by participants as desirable. Based upon the results obtained it is difficult to assess whether or not the consequences in this study were effective as reinforcing events because the reinforcer was accessed on only 4 occasions. Michael (1993)
explains that the effectiveness of a particular consequence in influencing future behavior is largely dependent upon establishing operations—stimulus events which alter the reinforcing effectiveness of other stimuli. In the current context, the performance for Company #1 appeared unchanged following the receipt of the price discount on four separate occasions. Given this limited sample it appears as though the discount was not effective as a form of reinforcement for Company #1; however, given that the price discount was not accessed by the other participants, it is not possible to conclude whether it was effective or not.

Other elements to consider in reviewing the results of this intervention are the characteristics of the participants themselves. Each of the companies participating in this study was selected based upon it’s previously sub-par performance in terms of purchasing mix and materials from the supplier. In short, they were selected because they were thought to have high performance improvement potential. One of the motivations for the current study was to explore whether or not a combination of feedback, goals, and incentives could affect an improvement in the overall performance of small businesses. However, a point to be considered is that each of the companies may have other characteristics that impact it’s performance. Two of the companies (Companies #1 and #4) operated chimney-sweep services prior to beginning restoration services. The owner-manager of Company #2 worked as a full-time firefighter in addition to offering chimney restoration as an ancillary enterprise. These characteristics are relevant because they introduce additional sources of income as well as limit the amount of time and effort that can be dedicated to the chimney restoration business. Access to additional income may have reduced the participants’ motivation to engage in behaviors related to improving their chimney restoration business. In addition to competing sources of income, three participants (Companies #2, #3, and #4) were
involved in business decisions that significantly impacted their daily business processes. Companies #2 and #3 began the process of buying-out their business partners, while Company #4 relocated his business to new facilities. The significance of events such as these is that they reduce the amount of behavior and attention that can be allocated toward the performance targets. Indeed, the owners of each of these companies reported to the supplier that these events were responsible for the gaps/cessation of data evident in their results. In short, factors such as buy-outs, relocations, or alternative sources of income could partially explain why they achieved very few of their goals and purchased very little mix.

While information about competing factors such as buy-outs, relocations, or other sources of income is important data for applied researchers to consider in evaluating an intervention, there are a few steps that researchers could take to avoid the complications that such variables introduce. To some extent a researcher could develop more strident screening criteria for participants; however, variables such as alternative sources of income or buy-outs are realities of the small business environment. To exclude participants based upon such characteristics compromises the external validity of the findings for the larger population of small business owner-managers.

Relevance to Small Businesses

The fact that Companies #2, #3, and #4 reported that their participation in the study was hampered, to some extent, by their involvement in business buyouts (Companies #2 and #3) or office relocation (Company #4) supports observations made by Bauc (1969) and Carbone (1980). That is, that the owner-manager of the small firm tends to be more concerned with the financial vitality (e.g., working capital, paying expenses) of the company than with performance measures such as sales, new
business contacts, etc. In other words, owner-managers are more concerned with 'paying the bills' than they are with tracking the daily or weekly performance of their company.

From a behavior-analytic perspective, the emphasis on working capital over other performance indicators is not surprising. The consequences with which feedback on working capital are paired tend to be more immediate and certain than the consequences paired with feedback--such as number of marketing contacts made, or percentage of sales closed. Feedback on working capital is paired with the payment of bills, payroll, taxes, etc. Failure to make payments on loans, rent, payroll, or taxes is likely to be followed by aversive consequences such as foreclosure, eviction, employee turnover, or fines. When the owner is able to make monthly or quarterly payments from her/his working capital, the result is that the threat of aversive consequences is removed or delayed. This contingency is what Daniels (1994) calls negative reinforcement, whereby a behavior is reinforced by the removal of an aversive stimulus event. Feedback on the amount of working capital is repeatedly paired (most likely every month) with the negatively reinforcing event described above. After several pairings, the feedback on working capital may acquire the capacity to function as a form of reinforcement. Hence, small business owner-managers' behavior of reviewing or monitoring working capital is being reinforced by the feedback itself.

Feedback with respect to other measures such as number of marketing contacts made, number of estimates written, or number of dollars in backlog are less likely to be paired with such immediate or certain consequences. The eventual consequence for making several marketing contacts may not yield a desirable consequence for several weeks if at all--likewise for the behavior of writing estimates. Hence the feedback on such measures is less likely to be paired with reinforcing consequences, and the
feedback itself becomes less likely to acquire any capacity to function as a form of reinforcement. The result is that the owner-manager's behavior of tracking or monitoring such feedback is not reinforced and the behavior itself is extinguished. If behaviors such as collecting, monitoring, and reviewing feedback are extinguished, then the owner will also fail to use this feedback to adjust how they operate their business on a daily basis. In terms of Brethower's TPS diagram, the information about performance is not truly functioning as feedback because it is not being used to affect the operations of the system. If this information is not useful in adjusting or maintaining the operations of the system, then no feedback loops exist in that system and it will eventually fail (Brethower, 1972; Eickhoff, 1991).

The purpose of the intervention used in this study was to help the participants establish internal and external feedback loops. In other words, the package intervention was intended to provide a format by which participants could consistently monitor other performance measures such as marketing contacts completed and estimates written. The participants could thereby use this feedback in determining how to allocate their time and behavior in running the business. From a behavior-analytic perspective, this intervention was intended to serve two functions: A reinforcement function and a discriminative stimulus function. With respect to the former, it was believed that receiving price discounts would be a desirable occurrence for participants, and thereby function as a form of delayed reinforcement for meeting or surpassing goals. The feedback itself would be paired with this consequence and eventually acquire some capacity to reinforce behaviors such as tracking or monitoring these data. With respect to the SD function of this intervention, it was believed that by combining goals and feedback, the sight of the performance data points in relation to the goal line on the graph would function as an antecedent stimulus for behaviors associated with attaining
that particular goal. However, as noted by Fellner and Sulzer-Azaroff (1984),
establishing goals as functional discriminative stimuli is dependent upon the extent to
which goal attainment has been paired with effective consequences. So to a
considerable extent the SD function of this intervention was largely dependent upon
contact with the intended consequence—price discounts.

For the small business owner-manager, a component critical to the success of
the firm is not only identifying and tracking performance feedback, but ensuring that
the feedback is paired with functional consequences. Brethower (1972) and Duncan
and Bruwelheide (1986) suggest that if performance feedback is useful to the recipient,
it may function as a form of reinforcement for behaviors such as reviewing or attending
to the feedback. In the current study, no attempt was made to assess the usefulness of
the feedback received. Presumably, data on marketing contacts, estimates written,
work completed, and work backlog were important to the participants; however, the
extent to which these data helped participants run their companies was not directly
assessed. The supplier did report that each of the participants commented on the value
and relevance of the feedback provided. To some extent, any performance
improvements manifested in the dependent variables for this study could be regarded as
indirect indicators of usefulness, although almost no change in performance was
observed for any of the participants. A worthwhile endeavor for future researchers in
the small business realm would be to investigate the utility of different feedback
measures from the owner-manager perspective. Another potentially fruitful pursuit
would be an investigation of the data used by owner-managers in running their firms.
Authors such as Bauce (1969) and Carbone (1980) contend that small business owners
tend to manage with little reliance on performance data beyond feedback on working
capital, however, neither author provides empirical validation for this contention.
Few performance improvement strategies (e.g. Total Quality Management, Balanced Scorecard, Management by Objectives) have been developed with the small business owner in mind (Chow et al., 1997). They have been developed primarily to address the performance needs of large organizational settings (Eickhoff, 1991; Robertson, 1993). Only recently have the performance needs and concerns of small business owners been given attention from experts in performance improvement (Chow et al., 1997). To some extent, the relatively recent interest in improving the performance of small businesses is attributable to the recent influx of small business ownership noted earlier in this paper. Many performance improvement strategies were not only geared toward the needs of larger organizations, but they were priced for wealthier clients as well. As Resnik (1988) notes, the small business owner typically operates within a very limited budget that does not allow for expenses on the same scale as the larger firm. As the economic impact of the small business market continues to expand, the need for performance improvement strategies formulated specifically for the needs of the small business owner will increase. It is perhaps unrealistic and inefficient to simply modify performance strategies developed for large firms to force-fit the small business realm. More customized and cost-effective strategies are needed to address the needs of the owner of the small firm.

The advantage of organizational models such as Brethower's (1972) TPS diagram and Rummler and Brache's (1995) Super-system Map is that they can be applied to organizations of any size or stature. Likewise, the principles of Behavioral Systems Analysis offer a universality in understanding how the environment controls the functioning of organizations as systems. Interventions such as the one described in this study merit further investigation because they offer the flexibility of application with firms of any size, as well as allow for application with one company or several.
Furthermore, feedback interventions can be administered with relatively little cost in terms of resources, time, and capital. While the results of the current study were inconclusive, additional research is needed using similar approaches to assess the viability and efficacy of these programs in small business environments.

Summary

At the beginning of this study it was believed that providing performance feedback to several small businesses would help the small businesses participating in the study perform more effectively. That is, the participants would increase the number of marketing contacts made and estimates written per week, as well as increase the dollars of production and backlog each week. The feedback provided the participants with information about their most recent 13 weeks of performance. Additionally, the feedback was designed such that it would be paired with goals and consequences to yield optimum effectiveness as both an SD and a reinforcing stimulus.

Based upon the results obtained in the current study, it is not possible to conclude that the combination of feedback, goals, and incentives was effective in improving the performance of the small businesses participating in this study. One factor likely to have impacted the results was the mild winter occurring in each participant's region. The warmer weather resulted in below-average business for each of the participants, and performance goals that were too high given the immediate business environment. One of the effects of the inflated performance goals was that participants did not encounter the planned consequence--price discounts. Without exposure to reinforcing consequences, the relative strength of feedback and goal setting in improving performance was compromised. Balcazar et al. (1986) and Calpin et al. (1988) explain that feedback and goals are unlikely to be effective unless paired with
effective consequences. Finally, the characteristics of the participants themselves may have limited their willingness and availability for improving their chimney restoration businesses.

The results of the current study do not detract from the considerable evidence in favor of combinations of feedback, goals, and consequences. However, they do provide future researchers with additional considerations for applying similar interventions in small business settings. Most notably, the design of the intervention should ensure that participants encounter reinforcing consequences for desirable performance. The design of the current intervention limited access to the planned consequence—price discounts. However, the intervention in this study offered many benefits for practical application. It allowed for participants to receive quantifiable, graphic feedback on a weekly basis. Additionally, the format of the feedback lends itself to establishing performance goals across multiple measures. The challenge for future researchers and practitioners is identifying an effective system of consequences that is both effective in altering participant performance and is at the same time practical for application.
Appendix A

Letter From Supplier to Participants
To: SOLID/FLUE Dealers

From: SOLID/FLUE Chimney Systems, Inc.

Date: 2/16/98

Subject: Deeper Discounts—50 Cents to 1-Dollar Per Bay

We’re upping the offer by giving back to you an even deeper discount for continued participation in our feedback program. We will now be offering you SOLID/FLUE material at one or two discount levels below your current level provided that you do the following:

• Send in your feedback weekly.
• Develop goals for your business with SOLID/FLUE for each item mentioned on the feedback sheet.
• When you meet 13 goals over a 13 week period you will qualify for one discount level higher than your current level (approximately 50 Cents per bag).
• If you meet 33 goals over a 13 week period you will qualify for two discount levels higher than your current level (approximately $1 per bag).
• Please note that the 25 cent per bag discount for sending in the feedback form will no longer be in effect, however the deep discount program also requires sending in the weekly feedback form.
• We will need to receive copies of the business cards for verification of the marketing contacts being made. These must be sent with your feedback information each week.

To determine your goals, we will work through a checklist form that we have designed for this program. Please call the home office if you are interested in participating.
Appendix B

Weekly Data Form
**Weekly Feedback Form**

Name: ______________________

Week Ending (Friday): ______________________
(fax every Monday before noon)

Phone Number: ______________________
Fax Number: ______________________

<table>
<thead>
<tr>
<th>Marketing Contacts Made</th>
<th>Actual</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>This measures the quantity of “face to face” contacts made with insurance officials, building officials, fire prevention officers, etc. It does not include sales telephone calls or visits to potential customers to give an estimate. When groups of people are addressed (such as a meeting with insurance adjusters) then each person present may count as one contact made.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimates Written</th>
<th>Actual</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is a quantity measure of the number of estimates written for a SOLID/FLUE lining job. When an estimate is written that includes two or more SOLID/FLUE linings at the same property, this is still counted as only one estimate.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work Produced</th>
<th>Actual</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is a quantity measure in dollars of the total value of work produced through the week. If a $10,000 job was started on Monday at 8 a.m. and by Friday at 5 p.m. it was half completed, then this represents $5,000 in work produced for the week.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dollar Backlog</th>
<th>Actual</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is a quantity measure in dollars of the total of all work sold but not yet completed.</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Gross Profit Per Job: (below)</th>
<th>Actual Gross Profit</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td></td>
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Appendix C

Goal Setting Worksheet
Determining Goals

1. List selling price (average) _________

2. List direct costs (average):
   Labor _________
   Materials _________
   Misc. _________

3. Subtract direct costs from selling price to determine gross profit _________
   (gross profit)

4. Divide gross profit (line 3) _________ into selling price (line 1) _________ to determine gross profit ________%.
   (yearly overhead)

5. Determine yearly overhead _________.
   Determine your desired yearly net income _________ (This is in addition to your salary.) Add these together to determine overhead and profit _________
   (overhead & profit)

6. Divide overhead and profit _________ into gross profit _________% to determine your needed yearly volume _________. Then divide this figure by 52 to determine your needed weekly volume _________
   (yearly volume)
   (weekly volume)

7. Using line 5, divide yearly overhead into 12 to determine monthly overhead _________. To determine monthly net income, divide yearly net income into 12 _________
   (monthly overhead)

8. Using a 50% closure rate as your standard, divide your needed yearly volume (line 6) _________ into your average selling price (line 1) _________ to determine the number of jobs you will need to do _________. Multiply this by 2 _________ and then divide by 52 to determine the estimates you will need to write per week _________.
   (estimates per week)
   (estimating formula)

9. When estimating jobs, list your estimated:
   Labor costs _________
   Material costs _________
   Misc. costs _________

   Then multiply times the multiplier for the appropriate gross profit you need per job.
BIBLIOGRAPHY


Small business administration's size standards: *Hearing before the committee on small business, United States Senate, 97th Cong., 1st Sess.* (1981).


