The Three-Contingency Model of Self-Management

Holly C. Harrison
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THE THREE-CONTINGENCY MODEL OF SELF-MANAGEMENT

By
Holly C. Harrison

A Dissertation
Submitted to the
Faculty of The Graduate College
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requirements for the
Degree of Doctor of Philosophy
Department of Psychology
Dr. Richard W. Malott, Advisor

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THE THREE-CONTINGENCY MODEL OF SELF-MANAGEMENT

Holly C. Harrison, Ph.D.
Western Michigan University, 2005

The goal of this dissertation is to evaluate people's needs for self-management and the effectiveness of their use of the three-contingency model of self-management. This model prescribes a set of self-management procedures that can be applied to self-manage virtually any behavior. College students used these procedures to manage their own behavior as part of an extended psychology-course assignment.

This evaluation began with the Procrastination Survey, the results of which assessed the frequency of the students' self-management problems. The self-management interventions of up to 168 students were then evaluated using their self-reported performance data and an anonymous survey. The performance data showed that nearly all of the students improved the management of their behavior from baseline to intervention. The anonymous survey was used to summarize details of the students' interventions, such as the target behavior, performance manager, honesty of their data reporting, honesty of their implementation of the procedures, and importance of their accomplishing the goal of the intervention.

In addition, the results of the Transfer Survey showed that use of self-management interventions transferred to other settings and other behaviors for 19% of the 107 students who completed the survey. Students also completed the Maintenance Survey after the course was over. The results of that survey showed that use of self-
management interventions maintained for 33% of the 72 students who completed the survey.
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Holly C. Harrison
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CHAPTER I
INTRODUCTION
Defining Self-Management

Self-management techniques allow people to modify their own behavior. Self-management is not a specific, unitary intervention, but rather a collection of techniques. These techniques range from a person simply making a commitment to change to completely designing and implementing an intervention. Regardless of the specific elements, all self-management techniques are implemented to help people control their own behavior with less reliance on outside behavior-change agents. Once learned, self-management techniques can then be applied to a wide variety of everyday behaviors.

Origins of the term self-management are typically traced back to Skinner (Newman, Buffington, Hemmes, & Rosen, 1996). When he first began writing about the topic, he called it self-control, rather than self-management (Skinner, 1953). Skinner (1953) wrote, "When a man controls himself, chooses a course of action, thinks out the solution to a problem, or strives toward an increase in self-knowledge, he is behaving. He controls himself precisely as he would control the behavior of anyone else--through the manipulation of variables of which behavior is a function" (p. 228). Skinner regards self-control as controlling one's own behavior, when that particular behavior produces conflicting consequences. He uses an example of drinking alcohol. The behavior produces the reinforcing consequences of less anxiety and increased ease of social interactions and, at the same time, the aversive consequences of the physical illness and the negative effects of irresponsible behaviors. Thus, there are both aversive and reinforcing consequences to drinking alcohol.
In his description of self-control, Skinner also describes a number of methods to use. These methods involve using physical restraint or physical aid, manipulating an eliciting or discriminative stimulus, manipulating an establishing operation, manipulating emotional conditions, using aversive stimulation, using various drugs, using self-reinforcement, using punishment, and engaging in some competing response (Skinner, 1953). All of these self-control techniques are similar to the techniques a person would use to control the behavior of others.

Eventually the terms *self-control* and *self-management* were used somewhat interchangeably, though it is not clear when this shift occurred. The term *self-management* appeared in Skinner’s *About Behaviorism* in 1974 (Epstein, 1997). Researchers in the 1970’s also used the term *self-management*, along with *self-control*, to describe their studies. Brigham (1982) states that, “presently no general consensus exists in the general area of research and treatment that dictates how each term should be used” (p. 33). Some behavior analysts still use the two terms interchangeably, but others argue for a distinction. Brigham (1982) argues that *self-management* is a better term because it has connotations of behavior. *Self-control* was often used as a noun and referred to as a cause of behavior or something inside the organism. *Self-management* has, therefore, been viewed as a more precise, technical term by some in the field of behavior analysis. This lack of agreement on the distinction between self-control and self-management is only one issue in the attempt to define self-management.

Some differences appear in the research described as *self-control* versus that described as *self-management*. The topic of self-control has been addressed in the basic research literature, where these basic researchers often state the defining features of self-
control. Rachlin and Green (1972) present self-control as the delay of gratification. They, along with other researchers, examine whether organisms behave in ways that produce either immediate reinforcers or slightly delayed, larger reinforcers. Rachlin (1974) says, "When subjects show self-control they prefer larger rewards in the future to smaller rewards in the present or, symmetrically, avoid greater pain in the future in return for lesser pain in the present" (p. 94-95). Though this characteristic of delayed versus immediate consequences is common in the basic self-control literature, examples will be given to show it is not always characteristic of the applied literature.

Other descriptions of self-control appear in the early, applied research. In their review of applications of self-control procedures used by children, O'Leary and Dubey (1979) write, "The term 'self-control' has been employed historically as a rubric for two related, but theoretically distinct, areas of research. In one instance, the independent variable (e.g., a modeling film) is implemented by the experimenter, and the dependent variable is either a child behavior explicitly identified as a self-controlling behavior (e.g., self-administration of a reinforcer) or a behavior presumably mediated by a self-controlling behavior (e.g., delay of gratification)" (p. 449). In the applied research the topic of self-control begins to address not only the delay of gratification, a dependent variable, but also a variety of self-controlling behaviors, such as self-instructions and self-reinforcement, which are independent variables. This change in the use of the term self-control leads to characteristics related to self-management research.

Research described as using self-management has been limited to the applied literature, whereas research described as self-control has crossed both the applied and basic domains. Self-management has been consistently applied to human behavior, and
not to the behavior of other animals. Applied research tends to study ways people can fix their self-control problems. Basic research tends more to address the parameters of the problems themselves and the variables of which they are a function. Therefore, the nature of applied research probably causes the limitation of the term self-management to human behavior. This applied research covers a broad range of self-management interventions. The researchers do not define the term self-management. More often, they simply state that self-management was used and then go on to describe the specific techniques used as part of the self-management. These techniques range from self-monitoring to self-reinforcement. Such a broad range of self-management applications leads most readily to a broad definition of self-management.

One of the broadest definitions of self-management is given by Kazdin (2001), who, similar to Skinner (1953), defines self-management as the application of behavioral principles to one’s own behavior. Kazdin (2001) says, “The techniques…represent instances in which one individual (the behavior-change agent) manages the contingencies to alter the behavior of another individual (the client). The client can apply many of the techniques to control his own behavior. When techniques are applied to alter one’s own behavior, they are referred to as self-control or self-management techniques” (p. 302). In reviewing the wide array of techniques researchers classify as self-management, Kazdin’s definition seems to best describe all of those techniques. This broad definition of self-management encompasses all self-applications of behavior analysis, no matter how specific or how all-encompassing. Though this definition may seem simplistic, it seems to best represent the way behavior analysis, as an entire field, refers to self-management.
Self-Management Techniques

Not only does the definition of self-management vary, but the specific techniques used in self-management interventions also vary. Most often, researchers successfully changed behavior by using a treatment package involving a combination of multiple self-management techniques. The following is a summary of the self-management techniques used by these researchers and the direct benefits obtained. Potential collateral benefits will be discussed in a later section.

Self-Recording of Performance

Self-recording is one of the most basic self-management techniques studied by the applied researchers; the participants simply observe and record their own performance. All self-management techniques can be used alone or in conjunction with other techniques. When other techniques are used, often they are used concurrently with self-recording (sometimes called self-monitoring, self-assessment, and self-reporting). Also, the way in which performance is recorded can vary. Commonly, the participant marks the occurrences of the target behavior on some type of recording form or check sheet. Participants may also record their performance on a graph (Burgio, Whitman, & Reid, 1983), score sheet (Olympia, Sheridan, Jenson, & Andrews, 1994), or wrist counter (Koegel, Koegel, Hurley, & Freia, 1992); or even rate their level of performance on a Likert scale (Ninness, Fuerst, Rutherford, & Glenn, 1991). Pierce and Shreibman (1994) devised a unique application of self-recording. Participants, low functioning children with autism, used a picture book to prompt each component of the self-managed task, such as setting the table or doing the laundry. The authors trained the participants to turn each page of the picture book only after the pictured component had been completed. They considered the page being turned to be self-monitoring of the occurrence of the desired
behavior. This self-management treatment package produced a decrease in inappropriate behavior and an increase in on-task behavior for all three participants.

**Self-Delivery of Reinforcers**

Self-delivery of reinforcers includes true self-reinforcement and what researchers often call *self-reinforcement*, though it is actually the delivery of reinforcers that follow the behavior by too great a time to reinforce the behavior on which those reinforcers were contingent. Self-delivery of reinforcers can not only be the delivery of reinforcers to oneself, but also the recruitment of reinforcers. One example of the self-delivery of reinforcers is provided by Ballard and Glynn (1975). They used a procedure in which students in a regular, third-grade class awarded themselves points for achieving their writing goals. These writing goals were based on the number of verbs, adjectives, and sentences written in the students’ stories. Students could then exchange each point earned for one minute of a self-selected activity reinforcer. This self-delivery of reinforcers successfully increased the target behaviors. The number of verbs, adjectives, and sentences each increased to more than twice its baseline level.

An example of recruitment of reinforcers can be seen in Connell, Carta, and Baer’s (1993) study. Preschoolers with developmental delays learned to initiate classroom transitions, such as cleaning up toys when playtime was nearing an end. The children recorded correct behavior by marking a smiley face or recorded incorrect behavior by marking a sad face on a posted recording form. They then recruited praise from a treatment provider by saying, “I’m done” or recruited a hug by approaching the treatment provider with arms outstretched. This combination of self-recording and recruitment of reinforcers “generated upward trends in active engagement, appropriate recruitment, and total teacher praise” (p. 349).
Self-Selection of Target Behaviors and Goals for Those Target Behaviors

Another self-management technique involves the selection of the target behavior, ranging from the selection of the performance goals of a pre-selected target behavior to the selection of the target behavior itself. Because a large portion of the published research on self-management was conducted with developmentally disabled participants, the self-selection of goals is not a common technique. One demonstration of self-selection appears in a study by Godat and Brigham (1999). Regular employees in a mid-sized organization learned general self-management skills and were then allowed to select their own target behaviors on which to apply a self-management intervention. The target behaviors ranged from declining excessive requests to walking away from complaining employees. Of the 35 participants who completed the self-management intervention, 31 were successful with success being defined as a "mean change from baseline of 50% or greater in the desired direction" (Godat & Brigham, 1999, p. 73).

Sanders and Glynn (1981) taught parents the use of self-monitoring and self-selection of the goals to manage a variety of parenting behaviors. The parenting behaviors were those that influenced the compliance of their children. Some of these parenting behaviors included prompting, instructing, ignoring, and providing social attention to their children at appropriate times. The researchers used the technique of self-selection of performance goals because it was practical and useful for the intervention. Parents benefited from being taught basic parenting skills and then having the ability to apply a self-management intervention to those skills, without the reliance on an outside change agent. The authors described the benefits in their statement, "The major findings of the study demonstrate the efficacy of self-management training in producing generalized behavior changes in parent and child behaviors in all settings" (p. 230).
Another study, conducted by Burgio, Whitman, and Reid (1983), showed that self-monitoring, self-selection of the goals, and self-reinforcement applied in an institutional setting could produce changes in direct-care staff and resident behaviors. Staff members used self-management to increase their interactions with residents and, concurrently, residents’ appropriate behaviors increased. Though maintenance was examined, treatment gains varied during this phase of the study.

Olympia, Sheridan, Jenson, and Andrews (1994) used self-monitoring, self-instruction, self-reinforcement, and self-selection of the goals with the purpose of determining whether this self-selection increases achievement of the goal. There was no difference in students’ goal achievement of homework accuracy when those goals were selected by the teachers, as compared to when they were selected by the students, themselves. However, the students who selected their own goals for homework completion met their goals more often than students whose goals were selected by the teacher. These results may simply be accounted for by the documented fact that students consistently selected lower goals for themselves than the teacher selected for them. Based on this possible confound, it is not clear how important self-selection of performance goals is in terms of goal achievement.

**Self-Instruction**

Christian and Poling (1997) used a combination of self-selection of goals, self-instructions, self-recording, and self-delivery of reinforcers to help improve the job performance of adults with developmental disabilities. Participants selected their own goals for the amount of time in which the work tasks would be completed. They then emitted self-descriptive verbalizations while they completed the work tasks, recorded the frequency of the behavior in a notebook, and self-delivered reinforcers for their desired
performance. The self-management intervention had a positive, but not always large, effect on task performance. Though this study did not attempt to demonstrate long-term maintenance, it did demonstrate that the improved performance maintained over a maximum of five maintenance sessions. The participants, their coworkers, and their supervisors all rated the intervention as acceptable. After treatment, both participants were able to keep jobs that they were at risk of losing and one even earned a raise. Therefore, as Christian and Poling pointed out, self-management techniques not only produce direct benefits on the target behavior, they can also produce collateral benefits.

Collateral Benefits of Self-Management

This section contains a description of the various potential collateral benefits of using self-management techniques and presents some of the empirical research demonstrating these collateral benefits.

Potential Collateral Benefits

Maintenance

Researchers hypothesize that because self-management interventions place more of the behavioral control with the individual, the intervention effects are more likely to maintain after the behavior analyst or therapist has terminated the intervention. Based on the principles of behavior, it might seem logical that self-management interventions would more likely maintain once the behavior analyst is no longer present. However, this assumes that the benefits of doing the self-managed behaviors are involved in some sort of behavioral contingencies so that they will actually maintain those self-management behaviors, perhaps through reinforcement or an analog to reinforcement. Empirical demonstrations of the actual occurrence of maintenance will be presented in the following section.
Transfer

Researchers have also hypothesized that self-management interventions might generate rules that can then transfer to other areas of the clients' life. Burgio and Burgio (1986) hypothesize that once self-management skills are acquired, they might then be applied to a wide variety of behaviors and situations with little or no involvement of the therapist. Empirical demonstrations of transfer will be discussed in the following section.

Cost

Additionally, researchers have hypothesized that cost could be greatly reduced by teaching people to manage their own behavior, because it would require less participation from outside change agents. People would be much more likely to receive services with this decreased cost/effort, because implementation of the intervention becomes easier and more practical for the behavior analysts or treatment providers. Cole (1992) hypothesized that teachers could spend more time teaching the entire class, because they would not need to spend so much of their time with one student who is having behavioral difficulties. The empirical demonstrations of all of these benefits will be discussed below.

Empirical Demonstrations of the Collateral Benefits

These collateral benefits are often merely hypothesized, rather than demonstrated (e.g., Ballard & Glynn, 1975; Burgio & Burgio, 1986; Koegel et. al., 1992; Olympia et al. 1994). It may be overly optimistic to hypothesize about the extent to which these collateral benefits will actually occur even when they are planned as part of the intervention, let alone when they are hypothesized to occur spontaneously. However, some of these benefits have been empirically demonstrated.

Brigham (1989) taught regular-education, middle-school students self-management skills and then examined whether those students used the skills outside of
the training environment without any further instruction or prompting to do so. Over a period of 10 weeks, one group of students participated in a course on operant behavior and self-management, while another group participated in a general psychology course. Both groups then participated in the “Good Behavior Game” in their math class. The “Good Behavior Game” is a system for providing consequences to the entire group based on the behavior of the individuals in that group. The group of students with the least number of disruptive behaviors at the end of class earned extra free time. During the “Good Behavior Game” in their math class, the group of students who learned self-management decreased their rate of disruptions to near zero, while the group of students who did not learn self-management had a consistent rate of disruptions throughout the intervention. None of the students reported realizing that the self-management or general psychology courses were related to the math course where the “Good Behavior Game” was used. Over half of the students reported attempting to use the self-management skills to manage their disruptive behavior during the “Good Behavior Game.”

Koegel and Koegel (1990) showed that self-recording could be incorporated into a treatment package that decreased the stereotypic behaviors of clients diagnosed as autistic. They showed that the results maintained during 50 weeks of maintenance probes with little involvement from service providers. This decreased involvement of service providers made the intervention less costly, less timely, less effortful, and therefore, more practical than interventions that require intensive involvement of service providers. The authors discussed the benefit of transfer in terms of how fast participants could be trained to use self-recording in settings other than the training setting. Though they did not get
spontaneous application of the treatment in novel settings, participants were quickly trained to apply the treatments in those settings.

Kissel, Whitman, and Reid (1983) demonstrated that a self-recording component could be used to train staff members to interact with severely and profoundly developmentally disabled clients in such a way that would increase the independent self-care behaviors of those clients. The staff behaviors related to verbal instructions, physical guidance, and reinforcement of client behaviors. The staff members appropriately and consistently applied the self-management skills and the clients' rate of independent self-care behaviors also increased. The staff use of the self-management package transferred to client behaviors other than those used in the training sessions and treatment gains maintained for a maximum of 46 observation sessions conducted over a period of 6 to 8 weeks following the intervention. In addition, social validity was shown in the staff's overall positive rating of the intervention. This high level of social validity may have contributed to the high level of staff compliance with the intervention.

Sowers, Verdi, Bourbeau, and Sheehan (1985) had developmentally disabled participants using a picture-cue system and self-monitoring to train initiation of various work behaviors. The intervention was designed to help the participants function in typical employment settings, where minimal supervision and reinforcement are the norm. The self-management package resulted in high levels of independent task changes for all of the participants. This means the participants no longer relied on constant supervision and reinforcement, making their training more efficient and less costly for their supervisors by requiring no more effort than is required with their typically functioning employees.
The authors also found that the high levels of independent task changes maintained during a month-long maintenance phase.

Because research on a variety of interventions addresses maintenance, it is the most commonly demonstrated benefit in the self-management literature. However, all of the potential benefits of maintenance, transfer, and cost were demonstrated in the collection of studies described in this section. Various other studies have also demonstrated at least one of the collateral benefits of using self-management techniques (Burgio, Whitman, & Reid, 1983; Connell, Carta, & Baer, 1993; Dean, Malott, & Fulton, 1983; Pierce & Schreibman, 1994; Sanders & Glynn, 1981; Stahmer & Schreibman, 1992).

So, these studies demonstrate that interventions based on self-management of performance can produce transfer, maintenance, and cost reduction. However, because these interventions were not compared to general performance management, it is not clear that self-management interventions are superior to general performance management in terms of obtaining transfer, maintenance, and the resulting cost reduction. In addition, the studies did not determine the value of each individual self-management technique, as they all involved some sort of treatment package.

The Current Research

Self-Management Procedures

The self-management procedures used in this dissertation are based on the three-contingency model of self-management (to be discussed shortly) and are described in *I'll Stop Procrastinating When I Get Around to It* (Malott & Harrison, 2005), to be referred to as *Procrastination*. The current researcher empirically evaluated and improved this book as part of her Master’s thesis.
Procrastination was designed to help university students acquire the skills necessary to use behavior-analytic self-management procedures. As part of these self-management procedures, the book, both implicitly and explicitly, emphasized the following behavioral systems analysis steps: 1) select a behavior to improve, 2) examine the natural contingencies, 3) design an intervention that involves changing the current contingencies, 4) implement the intervention, 5) evaluate the intervention, and 6) revise the intervention until reaching the goal.

In conjunction with the six steps of behavioral systems analysis, the self-management procedures consisted of a package of several specific self-management techniques. The self-management package included all of the techniques described earlier (self-recording, self-delivery of the behavioral consequences, self-selection of the target behaviors and goals, and self-instruction) along with recruiting a performance manager to help support the intervention. The recruited performance manager was supposed to provide support by meeting with the participant, at least weekly, to discuss whether the performance goals were met and whether the self-management procedures were implemented as planned. Most often the participants chose to lose money when they failed to meet their performance goals; and most often their performance managers were the people to whom they gave that money.

The essential feature of the self-management procedures is that they were designed around the three-contingency model of self-management, which is an adaptation of a more general model, the three-contingency model of performance management (Malott & Trojan Suarez, 2004). The three-contingency model of self-management points out that people can use delayed outcomes to control their behavior and points out the
importance of having a deadline for the behavior. Unlike the three-contingency model of performance management, in the three-contingency model of self-management, the person whose behavior is being modified is the same person who selects the behavior, selects the outcome for that behavior, provides the resources (outcomes), and works with the performance manager.

The three contingencies are 1) the ineffective, natural contingency, 2) the effective, indirect-acting, performance-management contingency, and 3) the effective, inferred, direct-acting contingency. Figure 1 is an example of the three-contingency model of self-management applied to the behavior of exercising and will be used to explain the model.

The natural outcome of one instance of Jen’s exercise is only an infinitesimal increase in her health. Though many instances of exercise will cumulate into the result of a significant improvement of health, the outcome of each instance of exercise is too small to control that instance of exercise.

This effective, explicitly designed performance-management contingency controls behavior because the outcome of each instance of exercise is both sizable and probable; this contingency can be effective whether its outcome is immediate or delayed. Most often, with verbal human beings, the performance-management contingency is indirect acting, as illustrated in Figure 1. An indirect-acting contingency controls behavior, though the outcome is too delayed to directly reinforce or punish the response.

When the performance-management contingency is indirect acting, it is the statement of the rule describing the performance-management contingency that indirectly controls behavior by creating the inferred, direct-acting contingency (the third
contingency in Figure 1). The statement of the rule makes noncompliance with the rule, combined with proximity to the deadline, an aversive condition as reflected in the inferred, direct-acting contingency. The outcome in the inferred contingency is immediate and directly controls the target behavior. Failing to exercise (noncompliance with the rule) produces various aversive states, commonly called fear, anxiety, etc.; exercising (complying with the rule) immediately terminates the fear related to losing the money.

**Ineffective Natural Contingency**

<table>
<thead>
<tr>
<th>Before</th>
<th>Behavior</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jen has a given level of health.</td>
<td>Jen exercises for 30 minutes.</td>
<td>Jen has infinitesimally better health.</td>
</tr>
</tbody>
</table>

**Performance-Management Contingency**

<table>
<thead>
<tr>
<th>S^0 (Deadline): Before going to bed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
</tr>
<tr>
<td>Jen will lose $5 at the end of the week.</td>
</tr>
</tbody>
</table>

**Inferred Direct-Acting Contingency**

<table>
<thead>
<tr>
<th>Before</th>
<th>Behavior</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jen fears the loss of $5.</td>
<td>Jen exercises for 30 minutes.</td>
<td>Jen doesn't fear the loss of $5.</td>
</tr>
</tbody>
</table>

*Figure 1. The three-contingency model of self-management applied to exercise.*

The important feature of both of the models is the analysis of why the natural contingencies for supporting performance often fail. Malott and Trojan Suarez (2004) have analyzed the cause of poor self-management in terms of the size and probability of the natural outcome, rather than the delay of that outcome. They said, “Poor self-management results from poor control by rules describing outcomes that are either too..."
small (though often of cumulative significance) or too improbable. The delay isn’t crucial” (p. 418). Therefore, interventions in the present study involved adding outcomes that were both sizable and probable, whether immediate or delayed.

This analysis contrasts with the traditional view, as exemplified by Rachlin and Green (1972), who applied their analysis within the context of self-control. In their laboratory experiments, smaller, immediate outcomes controlled behavior better than larger, delayed outcomes, thereby demonstrating poor self-control. They also examined what they called commitment. The pigeon could “make a choice” between two alternatives by pecking the corresponding keys. The two alternatives were (1) a delay followed by another opportunity to select either a small, immediate outcome or a larger, delayed outcome and (2) a delay followed by the restriction to the large, delayed outcome. By “choosing” the second alternative, the pigeon showed commitment. The greater the delay between the initial “choice” and the opportunity to make the response that produced the small, immediate or larger, delayed outcome, the better the commitment and, therefore, the better the self-control.

Various problems arise when trying to use Rachlin and Green’s research to understand real-world, human self-management problems. The delays occurring in everyday human behavior are far greater than those used in the laboratory experiments with nonhumans. Human behavior can be controlled by rules specifying outcomes delayed by hours, weeks, or even years, whereas the nonhuman behavior in the laboratory experiments was controlled by outcomes delayed by only seconds.

An additional, important feature of the three-contingency model of self-management is that the techniques are largely based on aversive control, whether
designed to increase or decrease behavior. When decreasing behavior, aversive control is used in the form of a punishment or analog-to-punishment contingency. When increasing or maintaining behavior, aversive control is used in the form of an analog-to-avoidance contingency. The problem with using reinforcement contingencies is that they do not stop procrastination; the reinforcer can be obtained at any time no matter how long the procrastination. To prevent procrastination, a deadline for the behavior needs to be added, making the contingency an avoidance contingency. If the target behavior does not occur before the deadline, the opportunity to obtain the reinforcer is lost (aversive control) (Malott & Trojan Suarez, 2004). Though the researchers whose studies were described earlier in this paper would describe their self-management techniques as using reinforcement, the current researcher would describe those self-management techniques as aversive control because there was an implied deadline for the behavior.

Most often the participants in this dissertation chose to lose a reinforcer they already possessed. Loss of already-possessed reinforcers was most practical in this type of non-institutional setting, because the researchers did not have additional reinforcers to contribute. In some cases, participants also chose to present aversive conditions. They presented aversive activities, like cleaning and doing exercise and aversive stimuli, like the pain from the snap of a rubber band on the wrist and the aversive taste of a spoonful of mustard.

Another important feature of the three-contingency model of self-management was that the participants designed and implemented their own self-management procedures with the weekly supervision of their course instructors. This level of involvement of the participants differs from much of the previous research, where the
participants received a pre-designed self-management intervention whose implementation was closely supervised by a professional behavior analyst. This difference is most likely due to the participant pool; whereas the previous research used self-management predominantly with children in regular education and developmentally disabled people, all of the self-management procedures in this research were used with normally functioning college students. For more details on the self-management procedures used in the current research, refer to Procrastination.

Self-Recorded Data

It should be pointed out that the participants in this research self-recorded all of their self-management-intervention data. A potential problem arises when using self-recorded data: the reliability/accuracy of those data is unknown. However, there is some support for the reliability/accuracy of self-recorded data. Horn and Brigham (1996) cite Barlow, Hayes, and Nelson’s book for their statement that “Research shows that clearly defined salient responses that are reported on a daily or weekly basis can be very accurately self-monitored” (p. 7). The responses recorded in this research are clearly defined, salient, and recorded at least weekly, if not daily.

Often, in the research on self-management interventions used with average, adolescent/adult participants where the target behavior occurs in non-institutional settings, the performance data are self-recorded. These researchers acknowledge the potential problems of using self-recorded data and attempt to assess, and in some cases, increase their reliability/accuracy by (1) collecting anonymous survey data about the honesty of the self-recorded data (Worthington, 1977), (2) making course points (when the self-management is part of a college-course assignment) contingent on simply completing the self-management intervention rather than demonstrating successful
behavior change (Clements & Beidleman, 1981), (3) informing participants of the explicit benefits of their successful use of self-management interventions (Worthington, 1979), and (4) measuring permanent products of the target behavior (Barlow, Hayes, & Nelson, 1984; McGlynn, 1980, McLaughlin & Nays, 1975). The self-management interventions used in this dissertation incorporated, to at least some extent, all four of these techniques.

Also, some point out that self-recorded data have value in spite of their potential lack of reliability/accuracy (Baldwin, 2000; Barlow et. al., 1984). Baldwin explains, “There are cases where other data exist, but they are too difficult to obtain or the costs of obtaining them are not worth the effort” (2000, p. 3).

**General Procedures**

The research in this dissertation consisted of a series of studies designed to evaluate the effectiveness of the three-contingency model of self-management, as used by college students, as part of an extended psychology-course assignment. A survey was used to assess the students’ self-management problems. The details and overall effects of the students’ self-management interventions were assessed with surveys and the students’ self-reported performance data. Also, transfer and maintenance of the use of self-management procedures outside of the course requirements were evaluated using surveys.

It should be noted that the research in this dissertation follows in the tradition of much of the self-management research described earlier. This research also involved treatment packages and did not do an individual component-analysis or a comparison of self-management techniques and general performance management.
CHAPTER II

GENERAL CONTEXT OF THE STUDIES

All of the studies described in this paper were conducted with students from Richard Malott’s sections of Psychology 460: Survey of Behavior Analysis Research, Psychology 610: Conditioning and Learning, and Psychology 598: Special Projects in Psychology; the latter two being graduate courses predominantly for Malott’s students. Because all of the data were collected within the regular course procedures, those course procedures must be considered as part of the context in which the studies were conducted. Therefore, the following is a description of the relevant parts of the general procedures of these courses.

Self-management was a component of all three courses. The Psychology 460 and Psychology 610 students read *Procrastination* and completed their own self-management intervention. All Psychology 598 students had previously completed Psychology 610, so they completed one or two additional self-management interventions for the Psychology 598 course, without rereading *Procrastination*. Throughout the semester, the students in all three courses received additional instruction about self-management and feedback on their specific self-management interventions from their course instructors. Because the Psychology 598 course procedures differed somewhat from the procedures of the other two courses, Psychology 598 will be discussed separately.

The Psychology 460 and Psychology 610 students read *Procrastination* as the first assignments of the course. Prior to 2001, students read *Procrastination* approximately 3 weeks after the semester had started. Students completed the Procrastination Survey sometime at the beginning of the semester. Because this survey was administered by various graduate students from 2001 to 2004, it is not known when
the administration occurred in relation to reading *Procrastination*. Upon completing *Procrastination*, students planned and implemented their own self-management intervention. They presented their performance data weekly in class, at which time they received feedback about their intervention from their instructor and peers. The duration of the interventions ranged from 5 to 10 weeks, depending on the length of the semester.

Students began their self-management interventions by recording at least 1 week of baseline performance. In some cases, the data reported during baseline were not representative of performance prior to the start of data collection. In these cases, the self-observation likely caused some level of reactivity. In order to account for reactivity during baseline, students sometimes reported retrospective baseline data for low-frequency behaviors or behaviors with a fairly stable frequency or duration. For example, retrospective baseline data could be collected on exercise when students never exercised in the weeks prior to baseline data collection and on eating fast food when students ate it every day in the weeks prior to baseline data collection. Also, students who could easily determine a retrospective baseline did not have to spend time recording baseline data as it occurred and could, therefore, begin their intervention immediately. The use of retrospective baseline data was introduced in recent semesters, so it is not known how often students reported retrospective baseline data.

At the end of the semester, after completing between 4 and 10 weeks of intervention, students concluded their self-management intervention. Though the surveys were not given every semester, in general students in both classes completed the Self-Management Survey and the Psychology 460 students also completed the Transfer Survey at the end of the semester. During the last week of the semester, students gave a
Microsoft PowerPoint presentation about their self-management intervention. They turned those presentations and a corresponding paper in to their instructors before leaving class on the day of the presentations.

Students were contacted after the course was over using contact information collected by their instructors on the first day of class. Students were emailed and/or called to administer the Maintenance Survey. The contact occurred during the fall 2004 semester and included all previous Psychology 460 and Psychology 610 students for whom contact information could be obtained.

As discussed earlier, the Psychology 598 students had all previously completed Psychology 610, so they simply began planning and implementing their self-management interventions at the beginning of the semester. Some of these students chose to continue managing the same target behavior as they managed in Psychology 610. Other than these differences, the procedures of Psychology 598 were the same as those for the Psychology 610 class.
CHAPTER III

STUDY 1: A SURVEY OF SELF-MANAGEMENT PROBLEMS

Introduction

This is the first of a series of studies on the use of self-management procedures to help students achieve their self-management goals. Surveys were used to assess the students' views about areas of poor self-management that were of concern to them. Though this study was conducted with university students, some, if not most, of the results might generalize to larger populations.

Method

Participants and Setting

The Procrastination Survey was completed by the Psychology 460 students in the spring and fall semesters from 2001 to 2004; and was completed by the Psychology 610 students in the summer semesters of 2001 and 2002. Though the survey was given to all of the students in these classes, it is possible that a small number of students did not turn in the survey. A total of 312 Psychology 460 students and 25 Psychology 610 students turned in the survey.

Procedures

The Procrastination Survey (Appendix D) consisted of 55 Likert-scale-rating, multiple-choice, and fill-in-the-blank questions. The students answered the questions by marking and writing their answers on a mark-sense form. The surveys were completed anonymously.

Results and Discussion

Generally, there were no important differences between the graduate and undergraduate students, and in those cases the data were combined. Where there were
differences, the data were not combined. Not every student answered every question on the survey. So the number of answers for each question on the survey varied from 333 to 337.

The results of the Procrastination Survey showed that the students had problems managing a variety of behaviors in different areas of their lives. The students reported having problems managing daily behaviors that contributed to their health, such as flossing, exercising, and eating healthful foods:

- Though 94% of the students reported that they knew they should floss, 41% never flossed and 34% flossed only once or twice a week.

- Though 72% of the students exercised at least 1 hour a week, 78% wished they spent more time exercising.

- Sixty-five percent of the students were not happy with their body weight. The more overweight the students perceived themselves to be, the less happy they were with their weight. Figure 2 shows the students' opinion of their body weight.

- Although 86% of the students judged their muscle build as "all right," only 3% were "very happy" with their muscle build. And the less muscular the students perceived themselves to be, the less happy they were with their muscle build.

- Though the students' frequency of consuming junk food was fairly evenly distributed from 1 to 7 days a week, 81% of the students wanted to consume junk food no more than 2 days per week.
Figure 2. What is your opinion of your body weight? Undergraduate N = 311, Graduate N = 25.

- Though 41% wished they never consumed caffeine, 34% drank it every day. A total of 293 students (88%) drank caffeine and of those students, 88% drank it more frequently than they desired. Figure 3 shows how often the students drank caffeine.
- Of the 144 students (40%) who used nicotine, 85% used it every day and 81% wanted to never use it.
- Two hundred seventy-nine students (84%) drank alcohol and 41% of those who drank were drinking it more frequently than they desired. Figures 4 and 5 show the number of days per week students drank alcohol and the number of days per week students wished they drank alcohol, respectively.
Figure 3. How many days per week do you drink caffeine? N = 334.

Figure 4. How many days per week do you drink alcohol? Undergraduate N = 308, Graduate N = 25.
Figure 5. How many days per week do you wish you drank alcohol for your optimum health and wellbeing? Undergraduate N = 308, Graduate N = 25.

- Though only 89 of the students (27%) used marijuana, 44% used it more frequently than they desired and, interestingly, 7% used it less frequently than they desired. Figure 6 shows how many days per week the students used marijuana, while Figure 7 shows how many days per week they wished they used marijuana.

- None of the graduate students used hard drugs such as LSD, heroine, or cocaine. Though only 25 of the undergraduate students (8%) used hard drugs, 56% used them more frequently than they desired and 8% used them less frequently than they desired.
Figure 6. How many days per week do you use marijuana? Undergraduate N = 309, Graduate N = 25.

Figure 7. How many days per week do you wish you used marijuana for your optimum health and wellbeing? Undergraduate N = 309, Graduate N = 25.
Students also reported having difficulty managing behaviors related to school, such as studying, writing term papers, and achieving their desired grades:

- Seventy-eight percent of the students had a grade point average of 3.0 or better (see Figure 8), and 40% of the students were not satisfied with their grade point average.

![Bar chart showing the distribution of grade point averages among undergraduate and graduate students.](chart.png)

*Figure 8. What is your grade point average? Undergraduate N = 310, Graduate N = 25.*

- Fifty-two percent of the 310 undergraduate students and 20% of the 25 graduate students were not achieving their desired average grade on term papers. Figure 9 shows the students’ average grades on term papers.

- Forty-five percent of the 311 undergraduate students and 44% of the 25 graduate students started working on term papers shortly before they were due, “when there was not enough time to do a good job” on the paper.
Figure 9. What is your average grade on term papers? Undergraduate N = 310, Graduate N = 25.

- Also, 56% of the 311 undergraduate students and 38% of the 24 graduate students spent fewer hours studying outside of class than they desired. The graduate students were spending more time studying (see Figure 10), which likely accounts for their lower percentage.

- Seventy-seven percent of the 294 undergraduate students and 43% of the 21 graduate students skipped at least 1 class, while 11% skipped 8 or more classes. Figure 11 shows how many classes the students missed.

- In the semester prior to completing the survey, 53% of the 310 undergraduate students and 32% of the 25 graduate students failed to complete at least a quarter of the assigned readings for their classes, while 24% of the 310 undergraduates and 12% of the graduates failed to complete at least half of the assigned readings.
Figure 10. How many hours per week do you study, outside of class? Undergraduate N = 311, Graduate N = 24.

Figure 11. How many classes did you miss last semester because you just blew them off? Undergraduate N = 310, Graduate N = 25.
• A small amount of the students, 8%, failed to complete at least a quarter of their assigned homework, while 30% of the students turned in at least one assignment late, for reasons other than illness, in the semester prior to completing the survey.

Students also had trouble managing other behaviors in their daily lives:

• Seventy-six percent failed to respond to at least one email per month, while 79% failed to initiate at least one email per month. Seventeen percent of the students failed to reply to 11 or more emails per month and 13% failed to initiate 11 or more emails per month.

• Forty percent of the students failed to reply to at least one letter per month, while 61% failed to initiate at least one letter per month. Of the 59% of the undergraduate students who failed to initiate letters, 84% missed 1 or 2 letters and of the 84% of the graduate students who failed to initiate letters, 71% missed 1 or 2 letters.

• Fifty-three percent of the students failed to send at least one postcard, and 24% failed to send at least three postcards, the last time they were on vacation.

• Sixty-three percent of the students spent between 1 and 4 hours each week doing hobbies, while 70% wished they could spend 5 or more hours each week doing hobbies. Sixty-nine percent of the students spent less time doing hobbies than they desired.

The results of the Procrastination Survey confirmed that many students perceived a considerable need for improvement in their performance in a variety of areas. In other
words, they were suggesting a failure to manage their own performance to achieve their personal life goals. This failure to achieve their goals suggests a need for self-management interventions.
CHAPTER IV
STUDY 2: SELF-MANAGEMENT INTERVENTIONS

Introduction

Prior to this research, no attempts had been made to examine the Psychology 460, Psychology 610, and Psychology 598 students' self-management interventions, as a whole. This study was divided into two parts: analysis of the self-management-intervention data and analysis of survey data. The survey was used to gather additional information about the details of the students' interventions, such as what target behavior they selected, how successful they felt their intervention was, and how honest they were when reporting their data. By conducting the survey and intervention-data analysis with these students, their interventions could be compared and contrasted, and the overall nature and effectiveness of their self-management procedures could be determined.

The Self-Management-Intervention Data

Method

Participants and Setting

As stated earlier, all of the students completed a self-management intervention. A total of 168 students' interventions from 1999 to 2004 were analyzed.

Procedures

This study consisted of the students' self-management-intervention data and focused on analyzing the overall effectiveness of the students' self-management interventions.
Results and Discussion

Sample Individual Interventions

This section contains some samples of actual performance data from 3 students whose data are included in the group analysis. In addition to recording performance of the target behavior, 2 of the students included a benefit measure. The benefit measure is used to show the effect (or in some cases, the permanent products) of the target behavior. For example, a benefit measure for the behavior of exercise is weight loss. In recent semesters, a small number of students included a benefit measure in their self-management interventions.

Figures 12 and 13 are the self-recorded data of Student 1, an undergraduate student, whose target behavior was doing knee exercises. As shown in her baseline data, she was not doing the exercises at all before the intervention. During intervention, her goal was to increase knee-exercise frequency to 7 days per week. She implemented an analog-to-avoidance contingency: For every day she exercised before the deadline of going to bed, she avoided having to give $1 to her roommate at the end of the week. She successfully reached her goal on 58% of the weeks during intervention.

She wanted to do the knee exercises because her doctor told her they would help decrease the pain caused by a knee injury. Because pain was difficult for her to quantify, her benefit measure was the number of days per week she took Tylenol for the pain. Figure 13 shows a marked decrease in her taking Tylenol during the intervention phase. She was even able to decrease to no Tylenol taken during 4 of the weeks.
Figure 12. Student 1’s target-behavior graph of the number of days per week the knee-exercise goal was met.

Figure 13. Student 1’s benefit-measure graph for doing knee exercises.

Student 2, a graduate student, did his self-management intervention on the target behavior of practicing the guitar. He was playing seven songs at an upcoming wedding and wanted to spend 3 hours each week practicing those songs. He also used an analog-
to-avoidance contingency: For every hour spent practicing the guitar each week, he avoided giving $5 to his roommate at the end of the week. As shown in Figure 14, he went from not practicing at all during baseline to meeting or exceeding his goal every week of the intervention. The wedding took place during week 7 of the intervention, which likely accounts for the large increase in hours that week.

Figure 14. Student 2’s target-behavior graph for the number of hours spent practicing songs on the guitar.

He also recorded a benefit measure. The benefit of practicing the songs was a decrease in the number of errors. To measure how well he played the seven songs, he did a weekly “test,” in which he played each song and counted the number of errors made in that song. He conducted these “tests” during 3 weeks of the intervention and his data are shown in Figure 15. He achieved 0 errors on all but 2 of the songs.
Figure 15. Student 2’s benefit-measure graph for practicing songs on the guitar.

Student 3, an undergraduate student, used a self-management intervention to decrease the number of cigarettes she smoked. Though most students recorded behavior in terms of weeks, Student 3 recorded how many cigarettes she smoked each day. Her daily goal gradually decreased from 19 to 9 cigarettes per day. She used two analog-to-punishment contingencies. She started out by losing $1 to her roommate for each cigarette above her goal she smoked per day. During the 4th week of the intervention (from days 29-35) she changed the contingency so that she had to wash her roommates’ dishes each day she went above her cigarette goal. She reported that doing the dishes was more aversive than losing the money. She went from a mean of 20 cigarettes per day during the 7 days of baseline, to a mean of 6 cigarettes per day during the last 7 days of the intervention (see Figure 16). Unlike the other two students, she did not record a benefit measure.
Figure 16. Student 3’s target-behavior graph for number of cigarettes smoked per day.

Group Analysis of Individual Interventions

This section contains the analysis of the data from the performance graphs of 168 individual self-management interventions. There were no important differences detected among the students in the three courses (Psychology 460, Psychology 598, and Psychology 610). Therefore, the data are presented for all students combined. Of the 168 students, the goal for 143 was to increase behavior, while the goal for 25 was to decrease behavior.

Self-management interventions to increase behavior. As will also be discussed in the survey section, students most often wanted to increase exercise. They also attempted to increase the following behaviors: eating healthful foods, completing schoolwork, studying, practicing a musical instrument, writing, reading, flossing, cleaning, and getting out of bed on time. To increase these behaviors, students used an analog-to-avoidance contingency involving loss of money. While most often the students graphed data in
terms of the number of days per week that their performance goal was met, some also graphed the amount of behavior per day or week, for example the number of hours spent practicing the guitar each week.

Of the 143 students who were attempting to increase behavior, 18 either did not record baseline data or did not indicate which data were recorded during baseline versus intervention. Therefore, those 18 students’ interventions could not be evaluated. Of the 125 students’ interventions, 95% actually increased the mean weekly amount of their target behavior from baseline to intervention. It should be noted that data are presented in terms of amount of behavior. The term amount was used so that all of the students’ weekly mean behavior could be compared regardless of whether those data were in terms of frequency or duration of behavior per week.

Figure 17 shows the mean weekly amounts of the target behavior for baseline and intervention. Each bar of the graph shows both the weekly mean amount of behavior for baseline and the weekly mean amount of behavior for intervention, for each student. A few of the students’ behaviors changed in an undesired direction. To indicate the direction of change, Figures 17 through 22 use a white bar when behavior increased from baseline to intervention and a black bar when behavior decreased from baseline to intervention. For the white bars, the bottom value of the bar indicates the mean for baseline and the top value of the bar indicates the mean for intervention. For the black bars, it is the opposite. For example, student 1 in Figure 17 had a baseline mean of 0 and an intervention mean of 1.25, and student 125 had a baseline mean of 142 and an intervention mean of 240. In Figure 17, students 52, 90, 103, 104, 106, and 109 showed behavior change in an undesired direction; the weekly mean amount of behavior
decreased from baseline to intervention. The bars representing these students’ data are black.

*Figure 17.* Baseline and intervention mean amounts of target behavior for students whose goal was to increase behavior. Each bar is for a single student. For the white bars, the bottom value of the bar indicates the mean for baseline and the top value of the bar indicates the mean for intervention. For the black bars, it is the opposite. N = 125.

As shown in Figure 17, students who attempted to increase behavior typically had weekly means of behavior between 0 and 7, most likely because they recorded the number of days per week they met their goals for the behavior. Therefore, the amount of behavior was also examined separately for each goal from 1 to 7 days per week. However, some students’ data could not be examined in this way because they did not specify their goal, had a goal that changed throughout the intervention, or had a goal that was not stated in terms of days per week.

Of the 86 (out of 125) students whose data could be examined according to weekly goal, none had a goal of doing the target behavior 1 day per week. One student had a goal of 2 days per week and went from a 0 weekly mean in baseline to a 2.71
weekly mean in intervention. Nineteen students had a goal of 3 days per week and their individual weekly means are shown in Figure 18. It is not clear why students 18 and 19 had a baseline weekly mean of between 5 and 7, but had a goal of 3 days per week. It appears that they may not have recorded their data as they had stated in their performance graphs. For example, student 18 intervened on pressing the snooze button on his alarm clock. It was unclear whether he recorded the number of times/days he pressed the snooze button or the number of days he met his goal of not pressing the snooze button.

**Figure 18.** Baseline and intervention mean amounts of target behavior for students whose goal was to increase behavior and had a goal of 3 days per week. Each bar is for a single student. For the white bars, the bottom value of the bar indicates the mean for baseline and the top value of the bar indicates the mean for intervention. For the black bars, it is the opposite. N = 19.

Figures 19 and 20 show the baseline and intervention mean amounts of behavior for goals of 4 days per week and 5 days per week, respectively. All 15 of the students with a goal of 4 days, and 21 of the 22 students with a goal of 5 days, showed an increase in their weekly mean amount of behavior from baseline to intervention. Only 3 of the
students had a goal of 6 days per week and their data were as follows: 0.75 in baseline and 5 in intervention, 2 in baseline and 4.6 in intervention, and 4 in baseline and 5.5 in intervention. So, all of the students with a goal of 6 days per week increased the weekly mean amount of behavior from baseline to intervention.

![Bar Chart]

Figure 19. Baseline and intervention mean amounts of target behavior for students whose goal was to increase behavior and had a goal of 4 days per week. Each bar is for a single student. For the white bars, the bottom value of the bar indicates the mean for baseline and the top value of the bar indicates the mean for intervention. For the black bars, it is the opposite. N = 15.

Figure 21 shows the data for the students who had a goal of 7 days per week. Twenty-five of those 26 students had an increase in weekly mean amount of behavior from baseline to intervention. Student 26 had a baseline and intervention weekly mean of 7.
Figure 20. Baseline and intervention mean amounts of target behavior for students whose goal was to increase behavior and had a goal of 5 days per week. Each bar is for a single student. For the white bars, the bottom value of the bar indicates the mean for baseline and the top value of the bar indicates the mean for intervention. For the black bars, it is the opposite. N = 22.

In addition to weekly frequency, goal achievement was analyzed. Because some students failed to report their goals for the target behavior, goal achievement could be determined for 115 of the 143 students (80%). Ninety percent of those students had an increase in percentage of weeks they met their goal from baseline to intervention.

Self-Management Interventions to Decrease Behavior. Students most often attempted to decrease smoking cigarettes. Students also attempted to decrease the following behaviors: consuming unhealthy food or drinks, swearing, saying “dude,” killing insects, biting their nails, and leaving the room before closing the cabinets. Students most often used an analog-to-penalty contingency involving the loss of money, though some used a direct-acting punishment contingency such as snapping a rubber band on their wrist. When attempting to decrease behavior, students recorded their data in terms of frequency of behavior per week or day.

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Figure 21. Baseline and intervention mean amounts of target behavior for students whose goal was to increase behavior and had a goal of 7 days per week. Each bar is for a single student. For the white bars, the bottom value of the bar indicates the mean for baseline and the top value of the bar indicates the mean for intervention. For the black bars, it is the opposite. N = 26.

Figure 22 shows the results of all of the interventions that involved decreasing behavior. Each bar of the graph shows the weekly mean amount of behavior for baseline and for intervention, for each student. For all of the students in Figure 22, the bottom value of the bar indicates the mean for intervention and the top value of the bar indicates the mean for baseline. For example, student 1 in Figure 22 had a baseline mean of 4 and an intervention mean of 0.71, and student 25 had a baseline mean of 112.67 and an intervention mean of 5.33. All of the students who attempted to decrease their target behavior showed an actual decrease in the mean weekly frequency of their behavior from baseline to intervention.
Figure 22. Baseline and intervention mean frequencies of target behavior for students whose goal was to decrease behavior. Each bar is for a single student. For all of the students, the bottom value of the bar indicates the mean for intervention and the top value of the bar indicates the mean for baseline. N = 25.

In addition to frequency of behavior, goal achievement was examined. Goal achievement could be determined for 23 of the 25 students, because 2 students did not clearly state their goals. Seventy-four percent of those 23 students had a goal of 0 instances of the target behavior, while 13% had goals greater than 0, and 13% had goals that involved gradually decreasing the behavior. All of the 3 students who wanted to gradually decrease had a target behavior of smoking cigarettes, and all of them also wanted to ultimately decrease to 0 instances of smoking. All 23 students failed to reach their goal during baseline, while 11 (48%) reached their goal during intervention (see Figure 23). For all 11 students who reached their goal, the mean percentage of weeks they met the goal was 59% (Of course, if they had been able to continue recording intervention data for more weeks, presumably that percentage would have been proportionately higher.)
Figure 23. Percentage of weeks the goal was met during intervention for students who were decreasing behavior. The goal was unknown for Students 21 and 23. The student numbers correspond to Figure 22. N = 25.

Overall, examination of the effectiveness of the students’ self-management interventions showed that virtually all of the students had some level of success in improving their behavior problems. Even in cases where students failed to meet their goals for the behavior, they still managed to change their behavior to at least some degree in the desired direction.

The Self-Management Survey

Method

Participants and Setting

The Self-Management Survey was completed by 58 Psychology 460 students in the winter 2000, fall 2001, winter 2002, and fall 2004 semesters, and 24 Psychology 610 students in the summer 2001 and summer 2004 semesters. Because these surveys were administered, and their data kept by, a number of graduate students over a period of 5 years, some of the data were lost or never collected.
**Procedures**

The Self-Management Survey (see Appendix E) consisted of 27 Likert-scale-rating, multiple-choice, and fill-in-the-blank questions. The students answered the questions by marking and writing their answers on the survey form. The surveys were completed anonymously.

**Results and Discussion**

The Self-Management Survey was used to gather data on various aspects of the students’ self-management interventions. The highlights of the results of the survey are presented in this section. One aspect of the self-management interventions addressed on the survey was the basic design of the interventions. As shown in Figure 24, exercise was the most commonly selected target behavior (at 51%) and other, rarer, examples of target behaviors included doing good deeds, going to bed on time, and wearing a seatbelt (all of which are in the *other* category in Figure 24). The *exercise* category included a variety of specific behaviors such as running, weight lifting, and doing pilates. The *diet-related* category included behaviors such as drinking water, restricting calorie intake, eating three meals a day, and consuming foods containing Omega-3 acids.

Forty percent of the students reported recording a benefit measure in addition to recording the target behavior. Sixty-five percent of the students contracted to meet with their performance managers once a week, with the remaining 35% contracted to meet more than once a week. Eighty-six percent of the students chose money as their consequence, with 9% using aversive activities, and 5% using loss of other reinforcers. Eighty-five percent of the students chose a roommate, friend, family member, or significant other as their performance manager, while the remaining 15% chose
classmates, coworkers, or one of Malott’s graduate students who was working on self-management research.

Figure 24. On what behavior did you do your self-management project? N = 78.

Another aspect of the students’ interventions was their level of importance and success. Though students had varying opinions about how important it was to accomplish the goal of their interventions (see Figure 25), almost all of them described their interventions as successful to some degree (see Figure 26). Students’ ratings of the value of completing their interventions in terms of learning about the management of human performance varied (see Figure 27).

Another aspect of the interventions was the problems that students encountered. Over half (57%) of the students made improvements to their interventions sometime during the semester. Commonly, problems related to the performance managers; 80% of the students rated their performance manager as being at least somewhat effective (see Figure 28).
Figure 25. How important was accomplishing the goal of your self-management project? N = 120.

Figure 26. In your opinion, was your self-management project successful in terms of helping you meet your goals? N = 80.
The survey also addressed the accuracy of the students' self-reported data and the treatment integrity of their interventions. Sixty-seven percent of the students reported that they were completely honest when recording and presenting their data, while no one reported being completely dishonest.

Of the 47 undergraduate students who responded to the relevant question (out of the 58 who completed the survey), 72% indicated that they never reported false data or overestimated their accomplishments. Most of the students in the remaining 28% indicated that they reported false data or overestimated their accomplishments only once or twice during the intervention, while one student indicated that he reported false data 8 times and another student indicated that he reported false data 75% of the time. Of the 21 graduate students who responded to the relevant question (out of the 22 who completed the survey), 95% indicated that they never reported false data or overestimated their accomplishments.
Figure 28. Was your performance manager effective in keeping you on track with your project? N = 75.

Of the 59 students for whom we could compare their planned and actual meetings with their performance managers, 85% reported meeting for as many weeks as planned. The remaining 15% met from 1 to 7 weeks less than planned. Ninety percent of the students met with their performance managers for at least as many days per week as they had contracted to meet.

Out of the 63 students who responded to the relevant questions, 83% paid their fines every time they were supposed to. The remaining 17% failed to pay their fines on from 1 to 10 of the weeks they were supposed to. Figure 29 shows how often students were supposed to pay fines.
Figure 29. How many weeks were you supposed to pay a fine? N = 68.

In conclusion, the survey data were consistent with the group analysis. The data suggest that the students were generally successful in their use of self-management interventions. The data also suggest that the interventions had a fair amount of reliability and treatment integrity.
CHAPTER V

STUDY 3: TRANSFER

Introduction

One of the hypothesized collateral benefits of using self-management techniques is that once learned, those procedures can be applied to virtually any behavior. The transfer evaluation focused on whether students were doing more than one self-management intervention while taking Psychology 460. For class, those students were already required to apply self-management procedures to one behavior, so using those procedures on more than one behavior would show that the use of self-management procedures had transferred to other, less-structured settings where no class-point contingencies were used to support the implementation of self-management procedures.

Method

Participants and Setting

The transfer evaluation was conducted in three semesters of Psychology 460, fall 2003, spring 2004, and summer 2004. Though all of the Psychology 460 students during the three semesters were given the survey, it is possible that a few did not complete the survey; however 107 students did complete the survey.

Procedures

The Transfer Survey (see Appendix F) was an anonymous questionnaire that consisted of three questions about the students' use of self-management procedures outside of the course requirements. Students spent approximately 5 minutes filling out the questionnaire in class at the end of the semester.
Results and Discussion

Twenty of the 107 Psychology 460 students reported using self-management on more than one behavior, a transfer rate of 18.69%. Those students reported managing the following behaviors: preparing for the GRE (2), completing homework (2), writing a thesis (1), eating healthful food (2), exercising (5), smoking (3), getting out of bed on time (1), doing laundry (1), writing letters (1), drinking alcohol (1), house cleaning (2), and managing their children’s behaviors (2). Of those 20 students, all but one reported that the self-management was useful to some degree in helping them improve the target behavior (see Figure 30).

*Figure 30.* How useful was self-management in helping you improve those behaviors? Fall 2003 N = 8, Spring 2004 N = 7, Summer 2004 N = 5.

The point contingencies of the Psychology 460 class acted as effective performance-management contingencies that supported using the self-management procedures on one behavior. Without the support of the performance-management
contingencies, it seemed unlikely that self-management procedures would be used. The 18.69% transfer rate may have been influenced by additional performance-management contingencies. Students earned optional, extra class points for doing additional self-management interventions. Also, students who used self-management procedures on studying for the GRE may have been enrolled in a one-credit Self-Management/GRE class involving point contingencies for using those self-management procedures. Without these potential added performance-management contingencies, the transfer rate may have been lower.

Based on some of the responses to the survey, it appeared that students may have misinterpreted the questions. They may have answered the questions based on their use of self-management techniques or performance management on another person’s behavior. The Transfer Survey has been revised so that if it is used in the future, these misinterpretations will be less likely to occur.

Nineteen percent of the students used self-management procedures in addition to the ones required as part of the self-management intervention for the course. These transfer data do suggest that transfer actually occurred to other behaviors and, to some extent, to other contexts. However, it is not clear to what extent the transfer was supported by other performance-management contingencies, such as course points, or the extent to which the transfer would have occurred spontaneously without the additional support, whatever it was.
CHAPTER VI
STUDY 4: MAINTENANCE

Introduction

Another potential collateral benefit of using self-management techniques is that they will more readily maintain once the behavior analyst has gone. Maintenance, after completing the courses, was measured to determine whether students continued their original self-management intervention or implemented any new interventions on other behaviors.

Method

Participants and Setting

The participants were 159 former students who had completed a self-management intervention in the Psychology 460, Psychology 610, and Psychology 598 classes. At the time they completed their self-management interventions, 58 were graduate students and 101 were undergraduate students. The participants completed the survey at various locations depending on where they received the email or phone call containing the survey.

Procedures

In the fall 2004 semester, the participants were given a short survey, the Maintenance Survey (see Appendix G), by email and/or by phone after they had completed the courses and were no longer required to use self-management procedures. First, all 159 participants were emailed the survey. The email appeared to be deliverable for 142 of the participants, however delivery of the email did not guarantee that the participants ever saw the email. For example, some participants may not have continued to check their WMU email accounts after graduating. Attempts were then made to call...
the participants whose emails were undeliverable and the participants who, though their email was deliverable, failed to reply within two weeks. A total of 47 participants completed the survey by email. Attempts were made to contact 105 of the participants by phone, some of them may have completed the survey by email after receiving the phone message. Out of the 37 participants for whom seemingly functioning phone numbers were obtained, 23 participants completed the survey by phone. For the remaining 12 (of the 37) participants, the researchers left one phone message. In a few of these 12 cases, it was not clear if the phone number was correct. An additional two participants were WMU students at the time of the study and completed the survey in person after their emails were undeliverable. As a result, surveys were completed by 72 (34 former graduate students and 38 former undergraduate students) of the 159 participants.

Results and Discussion

Contacting the participants was difficult. The more time that had passed since they had taken the courses, the more likely it was that their contact information was no longer valid. Despite these difficulties, 72 of the 159 participants were successfully contacted by email, by phone, or in person. There were no important differences between the former graduate and former undergraduate students, so the data have been combined for both groups.

Of the 72 participants who completed the survey, 24 used self-management procedures after the class, a maintenance rate of 33.33%. The 24 who continued to use self-management procedures were asked why they continued. Their responses to this open-ended question were divided into four categories: the intervention worked and they still wanted to do the behavior (16), for health reasons (4), it was for another class (3), had more free time to do self-management (1). The same participants were also asked if
their subsequent self-management interventions were successful. Their responses were divided into three categories: the intervention was successful (14), the intervention had just begun and the results could not yet be determined (5), and the intervention was being recycled (presumably because of lack of success) at the time of the survey (5).

The 48 participants who did not continue using self-management procedures were asked why they did not continue. Their responses to this open-ended question were divided into categories and are shown in Figure 31. The lack of performance management category contained responses that were in any way related to performance management, such as “no performance manager strict enough to keep track of me,” “no longer required for class,” and “lost motivation.” One difference between the former undergraduates and former graduates was that the graduate students responded “too busy” almost three times more frequently than the undergraduate students.

![Figure 31.](image)

*Figure 31. Why didn’t you continue using self-management procedures? N= 48.*

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When asked if they would consider continuing in the future, 41 of these 48 students who did not continue responded “yes” or “maybe.” The same 48 students’ responses to what would encourage them to continue are shown in Figure 32. Similar to the categories in Figure 31, the *if there was more performance management* category contained responses that were in any way related to performance management, such as “if it was a requirement for class” and “effective performance manager and [a] good consequence.”

![Figure 32](image)

*Figure 32. What would encourage you to use self-management procedures and keep them going? N = 48.*

It is not clear how representative these data are for the students who did not complete the survey. It is possible that those who did continue using self-management procedures were more likely to complete the survey because they wanted to report their success. However, regardless of whether the data are representative, this study demonstrated that a third of the 72 participants used self-management procedures after completing the courses and 58% were successful in doing so.
CHAPTER VII
GENERAL DISCUSSION

Though the studies in this dissertation have demonstrated that the students successfully changed their behavior with self-management interventions completed as part of the classes, in most cases, additional performance management is needed to get the students to continue using self-management or to use it outside of the class requirements. Analyzing, and attempting to maximize, the contingencies that support the use of self-management procedures would be a valuable line of research.

Also, attempts were made to determine the reliability and treatment integrity for some of the Psychology 460 students' self-management interventions. Because the current researcher consistently encountered more procedural difficulties than anticipated across three semesters of improved replications, this sequence of studies has been placed in Appendix B, rather than the body of this dissertation. Though the goal of the three experiments was to determine the natural reliability and treatment integrity of the interventions, the natural setting and elements of the students' self-management interventions had to be changed in order for them to be studied. Students had to provide consent for the collection of reliability data and detailed information about their performance managers for the collection of treatment integrity data, so they had to be made aware of the ongoing observation. Also, to most effectively collect treatment integrity data the researcher acted as the performance manager; however, this made the interventions atypical of what is experienced by the average student who has a less experienced performance manager. Also, getting good reliability and treatment integrity data in situations where people know they are being observed does not provide information about what is going in the real world. All of the difficulties described here
seem inevitable when trying to do an empirical study like this, especially one that has not been done before. Also, anonymous survey data may be the best way to study the natural reliability and treatment integrity of these kinds of self-management interventions.
The studies in this dissertation successfully examined various aspects of the self-management interventions of college-level psychology students. Students showed discrepancies between their actual and desired performance in their professional and personal lives, suggesting a failure to manage their behavior and a need for self-management interventions.

Anonymous survey data were used to develop a summary of the details of the students' self-management interventions, showing patterns in the design and effects of those interventions. The students' self-management-intervention data were examined to determine the effectiveness of the interventions in terms of amount of behavior and goal achievement. These studies showed that almost all of the students experienced at least some improvement in their behavior from baseline to intervention. Studies on self-management’s potential collateral benefits also showed a fair amount of both transfer and maintenance of the use of the self-management procedures.

Overall, the research in this dissertation demonstrated the value of self-management procedures in improving the behavior problems that regular people experience in their day-to-day life. Future research would be most valuable if focused on two areas: the "natural" reliability and treatment integrity of these types of self-management interventions and contingencies supporting the use of self-management interventions. By examining reliability and treatment integrity, researchers might better understand self-management used with regular people in non-institutional settings. Even more importantly, by examining the contingencies relevant to doing self-management,
researchers might be able to get more people to use self-management interventions to achieve their personal and professional life goals.
REFERENCES


Malott R., & Harrison, H. (2005). *I’ll stop procrastinating when I get around to it.* Manuscript submitted for publication. (This book can be obtained from the WMU Copy Desk.)


Appendix A

Research Protocol Clearance
Date: May 20, 2004

To: Richard Malott, Principal Investigator
   Holly Harrison, Student Investigator for dissertation
   Carie Vella, Student Investigator for honors thesis
   Cheryl Paberzs, Student Investigator of honors thesis
   Allison Meuller, Student Investigator of honors thesis

From: Mary Lagerwey, Ph.D., Chair

Re: HSIRB Project Number: 04-01-34

This letter will serve as confirmation that your research project entitled "Behavior Analysis Training System - Self-Management & Procrastination Book" has been approved under the exempt category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: May 20, 2005
Appendix B

Initial Research
DIRECT OBSERVATION OF SELF-MANAGEMENT INTERVENTIONS

Introduction

The essential feature of self-management procedures is that the individual manages his own performance. The self-management procedures used in this dissertation required that the students recorded their performance data and implemented the interventions themselves. Because the data were self-recorded, it was not possible to ascertain their reliability with complete confidence. Also, though the students enlisted a performance manager to help them adhere to their self-management intervention, it was not clear if the interventions were being implemented as planned. Therefore, this study examined the reliability and treatment integrity of some of the Psychology 460 students' self-management interventions.

The study consisted of three experiments with improvements made to the methods of assessing reliability and/or treatment integrity with each subsequent experiment. By frequently observing and interacting with the participants, the current researcher may have imposed subtle, unintended performance-management contingencies that influenced the effectiveness of the self-management interventions of these students. Attempts were made to keep the observation procedures of these experiments as unobtrusive as possible. However, efforts to improve the procedures of the experiments may have resulted in increased obtrusiveness. Because each experiment involved slight changes to its procedures, the methods and results will be presented separately for each experiment.
Experiment 1

Method

Participants and Setting

Out of 41 students in Psychology 460 during the fall semester of 2003, 6 qualified as participants. All 6 participated for a maximum of 40 extra class points which could be used to replace missed assignments. The extra class points were given not for doing the self-management intervention, but rather for allowing the current researcher and research assistants to collect data on the interventions’ reliability and treatment integrity. Only 5 of the 6 participants completed the study.

Procedures

All students in Psychology 460 completed a one-page form (see Participant Information Form in Appendix C) as soon as they finished designing their self-management intervention. The purpose of this form was to gather information about the students’ interventions in order to determine if they were possible participants for this study. Only those students whose self-management target behavior was exercising at the Student Recreation Center (SRC) at WMU were eligible to participate. This participant pool was selected because the students’ self-recorded performance data could be compared to their attendance records at the SRC.

Students who chose to participate signed a consent form (see Informal Consent Form in Appendix C) and completed the Contact Information Form (see Appendix C) describing how their performance managers could be contacted. Copies of the consent forms were given to the director of the SRC and the study began.

The reliability of the participants’ performance data was checked by comparing their data to the SRC’s attendance records. All patrons of the SRC needed to scan their

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student identification card when entering the exercise rooms. Though entrance to the SRC did not guarantee that the participants exercised while they were there, it was highly likely that they did exercise each time they entered the SRC. In the spring 2005 semester, attempts were made to contact the participants in all three of the experiments. Five out of the 13 participants were successfully contacted, and 4 exercised every time they entered the SRC. On one occasion, 1 participant entered the SRC and left without exercising because his friend was not able to enter with him.

Participants recorded their data in terms of how many days per week they exercised. The reliability was assessed in terms of the percentage of agreement between the number of days of exercise reported by the participants and the number of days they entered the SRC. These reliability checks occurred randomly at a minimum of 25% of the total weeks the self-management intervention was in effect. The weeks were randomly selected by drawing numbers. To evaluate treatment integrity, the researcher or research assistants contacted the participants' performance managers by phone or by email on the same weeks as the reliability checks. To avoid imposing additional performance management, there was minimal contact between the participant and the researchers during the study.

Unfortunately, this effort at minimal contact sometimes resulted in missing information and incomplete data. As described earlier, the participants gave the researcher information about their self-management interventions at the beginning of the experiment, using the Participant Information Form and the Contact Information Form (see Appendix C). This information was used to plan which weeks to verify the data with the SRC and to plan the contact with the performance managers. Incorrect information
about the participants' interventions and about how to contact the participants and their performance managers was discovered throughout the study, causing delays and loss of data. Also, it was difficult to get participant compliance on the recording procedures. If the participants also exercised at locations other than the SRC, they were instructed to record the location on their weekly graph. The researchers observed the participants' weekly self-management presentations in class and gave feedback about the correctness of the participants' recording. Despite this feedback and even loss of the extra class points, some participants continued to fail to record the location of the behavior. It was likely that the points were not powerful reinforcers for some of the participants.

Another problem related to comparing the participant data to the SRC data. Reliability was checked on only 25% of the total weeks of the intervention. In other words, the SRC attendance data were not collected over the entire intervention. Participants recorded data weekly and determined the day that the weeks would start and end. The SRC data were collected to correspond to a particular week in the participant's intervention. At the end of the semester, participants turned in their final report and their self-recorded data were compared to the SRC data. Some participants had recorded data differently than they had planned at the beginning of the semester, making it impossible to compare the two sets of data. For example, at the beginning of the semester, a participant reported that she would be recording data in terms of the frequency of exercise per week, with her weeks running from Monday to Sunday. Therefore, the SRC data were collected for 25% of those Monday-to-Sunday weeks. However, when the data were compared, it was discovered that the participant's weeks had been recorded as
running from Wednesday to Tuesday. Therefore, reliability could not be determined for that participant.

**Results and Discussion**

A total of five out of 6 participants completed the study. However, as discussed earlier, participant 5a gave inaccurate information about the day on which her weeks started. It was not possible to determine the reliability of her data. Of the remaining four participants, participant 4a chose not to participate in the treatment integrity component and participant 2a was using another student’s identification card to enter the SRC. Though he was asked repeatedly about the discrepancy between his data and the SRC data, he did not tell the researchers about the card until the end of the study. (The reliability and treatment integrity data for all 6 participants are summarized in Table B1.)

<table>
<thead>
<tr>
<th>Participants</th>
<th>Baseline Mean Weekly Frequency of Exercise</th>
<th>Intervention Mean Weekly Frequency of Exercise</th>
<th>Reliability</th>
<th>Treatment Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>1 day of exercise</td>
<td>4.63 days of exercise</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>2a</td>
<td>7 days of exercise</td>
<td>7 days of exercise</td>
<td>Used another student’s ID to get into the SRC</td>
<td>100%</td>
</tr>
<tr>
<td>3a</td>
<td>0 days of exercise</td>
<td>1.25 days of exercise</td>
<td>Never attended the SRC</td>
<td>33%</td>
</tr>
<tr>
<td>4a</td>
<td>1.5 days of exercise</td>
<td>3.11 days of exercise</td>
<td>90%</td>
<td>Chose not to participate in the treatment integrity component</td>
</tr>
<tr>
<td>5a</td>
<td>0 days of exercise</td>
<td>2.82 days of exercise</td>
<td>Could not compare student and SRC data</td>
<td>100%</td>
</tr>
<tr>
<td>6a</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Dropped out of study</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Table B1. Summary of results for all participants of Experiment 1.*
Four of the participants were successfully contacted after the experiment ended. All four reported that they felt their self-management intervention was successful. Three of those 4 participants said completing the intervention improved their health and impacted their lives in terms of weight loss (3), a better figure (1), feeling better about themselves (2) and sleeping better (1).

In conclusion of Experiment 1, 4 of the 5 participants for whom it was possible to obtain the relevant data showed 100% treatment integrity. Of the 2 participants for whom it was possible to obtain reliability data, both showed between 90% and 100% reliability.

Experiment 2

Method

Participants and Setting

Out of 33 students in Psychology 460 during the spring semester of 2004, 13 students qualified as participants. Of the 13 students who qualified, 6 chose to participate for a maximum of 40 extra class points. A total of 3 participants completed the study.

Procedures

Experiment 2 used the same methods as Experiment 1, with the exception of one major improvement. The SRC data had previously been collected for only 25% of the total weeks of the intervention. Those data were collected on a daily basis by emailing a contact person at the SRC. In Experiment 2, the SRC data were collected in the form of a semester-long report. This change eliminated the need to send frequent emails to the SRC and eliminated some of the problems related to comparing the participant and SRC data.

Results and Discussion

Despite this improvement, some of the difficulties involving the lack of contact with the participants and lack of powerful reinforcers remained. Again, despite feedback
and loss of the extra class points, participants failed to record when they exercised somewhere other than the SRC. This problem was worse in Experiment 2 than it had been in the previous experiment. Two of the participants (1b and 2b) failed to record the location of the exercise, making it impossible to compare their self-recorded data to the SRC’s data. Another participant (3b) recorded his data in terms of hours of exercise, rather than days of exercise, making it impossible to compare his data to the SRC’s data.

Also, a confound was discovered related to the treatment-integrity component of the study. In all three experiments, the participants’ performance managers were often their friends or relatives and may have reported the participants’ compliance with the intervention more favorably than it really was. This did occur at least once during the study, as reported later by that participant.

The data for all of the participants are summarized in Table B2. Also, two of the participants were successfully contacted after the experiment ended. Both reported that their self-management interventions were successful and that the interventions improved their health. One of the participants specified that he lost weight, felt more fit, and felt better about himself.
In conclusion of Experiment 2, 5 of the 6 participants showed 100% treatment integrity, while 1 participant had 0% treatment integrity. The 2 participants for whom reliability could be assessed, showed low levels of reliability, most likely because of a failure to record when they exercised at locations other than the SRC. The most valuable result of Experiment 2 was that it indicated improvements to be made in Experiment 3.

**Experiment 3**

**Method**

**Participants and Setting**

Out of 25 students in Psychology 460 during the fall semester of 2004, 3 students qualified as participants. Of the 3 students who qualified, 1 chose to participate for a maximum of 50 extra class points.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Baseline Mean Weekly Frequency of Exercise</th>
<th>Intervention Mean Weekly Frequency of Exercise</th>
<th>Reliability</th>
<th>Treatment Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1b</td>
<td>1.33 day of exercise</td>
<td>3.33 days of exercise</td>
<td>13% (Probably due to incorrect recording)</td>
<td>100%</td>
</tr>
<tr>
<td>2b</td>
<td>3 days of exercise</td>
<td>3.3 days of exercise</td>
<td>44% (Probably due to incorrect recording)</td>
<td>100%</td>
</tr>
<tr>
<td>3b</td>
<td>0 hours of exercise</td>
<td>2.33 hours of exercise</td>
<td>Could not compare SRC and student data</td>
<td>100%</td>
</tr>
<tr>
<td>4b</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Dropped out of study</td>
<td>100%</td>
</tr>
<tr>
<td>5b</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Dropped out of study</td>
<td>0%</td>
</tr>
<tr>
<td>6b</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Dropped out of study</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table B2. Summary of results for all participants of Experiment 2.
Procedures

Once again, the methods of Experiment 3 remained the same as the previous experiments with the exception of a few changes. The changes in this final experiment involved more contact with the participant. The participant emailed her data to the researcher every week and the SRC reports were compared to the participants' self-recorded data every week. These changes made it possible to detect and intervene on failure to record the location of the behavior throughout the semester. The weekly, one-on-one email contact may have also imposed more social contingencies that supported correct recording. Because the weekly emails required slightly more effort from the participant than in the previous experiments, the extra class points were increased to 50, as opposed to 40 in the previous experiments.

Also, to increase the chances of the performance managers giving accurate information, Experiment 3 involved asking the performance managers more questions than in the previous studies. The earlier experiments involved asking the performance managers if they met with the participant that week. This was a simple yes or no answer, making it hard to determine if the performance manager was giving false information. The final experiment involved asking the performance manager when he met with the participant that week, how many times the participant did the behavior during the week, how much money the participant was supposed to pay, and how much money the participant actually paid. If the performance manager could answer the questions and the answers matched the participant's data, it was more likely the performance manager had met with the participant that week and was giving accurate information.

In the 9th week of the self-management intervention (which was the 5th week of the intervention phase), the current researcher became the participant's performance
manager. The participant requested this change, because her previous performance manager failed to regularly check on her performance and enforce her performance-management contingency. This researcher simply recorded the treatment integrity each week.

Results and Discussion

As shown in Table B3, the participant achieved 100% reliability; all of her self-recorded data matched the data provided by the SRC. Her treatment integrity data varied. While using her boyfriend as her performance manager, her treatment integrity was 0%. During that time, her performance manager was not meeting with her and was unable to answer questions about her intervention. The participant reported that she paid her fines only 1 of the 10 times she was supposed to pay. Once the current researcher became the participant’s performance manager, her treatment integrity was 100%. Because of the problems with her original performance manager, she described her intervention as “not entirely” successful. However, she did report that the intervention impacted her life by getting her to exercise much more than she was before, and the increase in exercise helped improve her health at least a “little bit.”

<table>
<thead>
<tr>
<th>Participants</th>
<th>Baseline Mean Weekly Frequency of Exercise</th>
<th>Intervention Mean Weekly Frequency of Exercise</th>
<th>Reliability</th>
<th>Treatment Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1c</td>
<td>0 days of exercise</td>
<td>3.33 days of exercise</td>
<td>100%</td>
<td>0%, then 100%</td>
</tr>
</tbody>
</table>

Table B3. Summary of results for participant of Experiment 3.

Though the procedures of this final experiment allowed for the most complete data collection, they also influenced the participant’s self-management intervention. Frequent contact with the current researcher may have imposed additional performance
management on the target behavior and the behaviors related to using the self-management procedures. The frequent contact made the reliability checks more obtrusive in this experiment, possibly increasing the participant’s reactivity and increasing the reliability of her self-recorded data. Also, having the researcher as the performance manager made the intervention more of the ideal, rather than the typical, scenario. So, the results would not generalize to the other student interventions that did not have “professional” performance managers.
Appendix C

Materials Used in Initial Research
## Contact Information Form

<table>
<thead>
<tr>
<th>Your name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>When is the best time to contact your performance manager?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What is the best way to contact your performance manager? Phone, email, other?</th>
</tr>
</thead>
</table>

| Fill out this section if you haven’t already given us this information for your performance manager: |
| First name:           |
| Email address (if he/she checks it regularly): |
| Phone number:         |
Partipant Information Form

Please fill out this form as accurately as possible. We will use the information to determine if you are eligible to participate in a self-management study. If you are eligible, you will have the opportunity to earn OAPs for participating. Feel free to contact Holly Harrison if you have any questions.

<table>
<thead>
<tr>
<th>Name:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Behavior:</th>
</tr>
</thead>
</table>

What are your goals for the behavior (example: run for **30 minutes, 3 times a week**)?

<table>
<thead>
<tr>
<th>Where will you do the behavior?</th>
</tr>
</thead>
</table>

If you will exercise at the rec center, would you give me permission to check their records to see when you were there?

<table>
<thead>
<tr>
<th>When will you do the behavior?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Will there be any proofs of your behavior? If yes, list them.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>When will/did your baseline start (date)?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>When will your intervention start (date)?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>On what day of the week will your weeks start?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>What will be your performance-management contingency for the behavior?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SD (Deadline):</strong></td>
</tr>
</tbody>
</table>

```
<table>
<thead>
<tr>
<th>Before</th>
<th>Behavior</th>
<th>After</th>
</tr>
</thead>
</table>
```

When will you meet with your performance manager?

<table>
<thead>
<tr>
<th>Who will be your performance manager?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Can I contact your performance manager?</th>
</tr>
</thead>
</table>

If yes, please give us the following information for your performance manager (if you’d prefer, you can leave this part blank and we will get the info from you later if you participate):

**First name:**

**Email address (if he/she checks it regularly):**

**Phone number:**
Informal Consent Form

Psychology 460:
Self-Management Optional Activity Points Project

I am completing the self-management optional activity points project as part of the regular assignments for my Psychology 460 class. As part of this project, Holly Harrison will check my attendance at the Student Recreation Center for the entire Fall 2004 semester. My signature below shows that I give my permission for Holly to view the records that show when I swiped my identification card at the Student Recreation Center during the Fall 2004 semester.

Printed Name __________________________  Date __________

Signed Name __________________________  Date __________
Appendix D

Procrastination Survey
Procrastination Survey

I'll Stop Procrastinating when I Get Around to It
Anonymous Questionnaire

1. In which class are you taking this questionnaire?
   a. PSY 100 H
   b. PSY 360
   c. PSY 460
   d. PSY 610
   e. other

2. How many days per week do you floss?
   a. 0
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7

3. How many cavities do you have?
   a. 0
   b. 1-3
   c. 4-7
   d. 8-11
   e. 12 or more

4. Did you know you should floss daily before you read the procrastination book? (If you have not read the procrastination book, do you know you should floss daily?)
   a. yes
   b. no

5. On average, how many emails per month do you fail to reply to?
   a. 0
   b. 1-10
   c. 10-50
   d. 51-100
   e. More than 100

6. On average, how many emails have you failed to initiate per month (messages that you should have written, but were not reply messages)?
   a. 0
   b. 1-10
   c. 10-50
   d. 51-100
   e. more than 100
7. On average, how many letters per month do you fail to reply to?
   a. 0
   b. 1-2
   c. 3-5
   d. 6-15
   e. 16 or more

8. On average, how many letters per month have you failed to initiate?
   a. 0
   b. 1-2
   c. 3-5
   d. 6-15
   e. 16 or more

9. Last time you were on vacation, how many postcards did you fail to initiate?
   a. 0
   b. 1-2
   c. 3-5
   d. 6-15
   e. 16 or more

10. What is your average grade on term papers?
    a. A
    b. B
    c. C
    d. D
    e. E

11. What would you like your average grade to be on term papers?
    a. A
    b. B
    c. C
    d. D
    e. E

12. When do you begin work on term papers?
    a. Not applicable
    b. When it is first assigned
    c. With adequate time to work on paper
    d. Shortly before it is due (not enough time to do a good job)
    e. The day it is due (really not enough time to do a good job)
13. How many credits do you have this semester?
   a. 0
   b. 1-6
   c. 7-12
   d. 13-16
   e. >16

14. How many hours per week do you study, outside of class?
   a. 0
   b. 1-3
   c. 4-7
   d. 8-11
   e. 12 or more

15. If you really had your act together how many hours do you wish you studied?
   a. 0
   b. 1-3
   c. 4-7
   d. 8-11
   e. 12 or more

16. How many hours per week do you exercise?
   a. 0
   b. 1-3
   c. 4-7
   d. 8-11
   e. 12 or more

17. How many hours do you wish you were exercising per week?
   a. 0
   b. 1-3
   c. 4-7
   d. 8-11
   e. 12 or more

18. What is your opinion of your body weight?
   a. underweight
   b. appropriate
   c. 1-5 lbs. overweight
   d. 6-10 lbs. overweight
   e. more than 10 lbs. overweight
19. How happy are you with your body weight?
   a. very happy
   b. happy
   c. so-so
   d. unhappy
   e. very unhappy

20. How satisfied are you with your muscle build?
   a. too muscular
   b. a little bit too muscular
   c. all right
   d. a little too weak
   e. too weak

21. How happy are you with your muscle build?
   a. very happy
   b. happy
   c. so-so
   d. unhappy
   e. very unhappy

22. How much time per week do you spend doing hobbies?
   a. 0 hours
   b. 1-4 hours
   c. 5-8 hours
   d. 9-12 hours
   e. 13 hours or more

23. How much time do you wish you could spend doing hobbies each week?
   a. 0 hours
   b. 1-4 hours
   c. 5-8 hours
   d. 9-12 hours
   e. 13 hours or more

24. How many days per week do you consume junk food?
   a. 0
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7
25. How many days per week would you like to consume junk food to achieve your optimum health and well-being? Yes, you can either increase or decrease the days/week.
   a. 0
   b. 1-2
   c. 3-4
   d. 5-6
   e. 7

The following answers apply to questions 26-37.
   a. 0
   b. once in a while, but not once a week
   c. 1-3
   d. 4-5
   e. 6-7

26. How many days per week do you take Aspirin?
27. How many days per week do you wish you took Aspirin for your optimum health and well-being?
28. How many days per week do you drink caffeine?
29. How many days per week do you wish you drank caffeine for your optimum health and well-being?
30. How many days per week do you smoke or chew nicotine?
31. How many days per week do you wish you smoked or chewed nicotine for your optimum health and well-being?
32. How many days per week do you drink alcohol?
33. How many days per week do you wish you drank alcohol for your optimum health and well-being?
34. How many days per week do you use marijuana?
35. How many days per week do you wish you used marijuana for your optimum health and well-being?
36. How many days per week do you use hard drugs (LSD, cocaine, heroine, etc)?
37. How many days per week do you wish you used hard drugs for your optimum health and well-being?

38. What level are you in school?
   a. Freshman
   b. Sophomore
   c. Junior
   d. Senior
   e. Graduate student
39. What final degree do you want to get?
   a. N/A or none
   b. Associates
   c. Bachelors
   d. Masters
   e. Doctorate

40. What is your GPA?
   a. N/A
   b. 3.5 - 4.0
   c. 3.0 - 3.49
   d. 2.5 - 2.99
   e. below 2.5

41. If you are less than very satisfied with your GPA, what is the lowest GPA with which you would be very satisfied?
   a. N/A (currently satisfied)
   b. 3.5 - 4.0
   c. 3.0 - 3.49
   d. 2.5 - 2.99
   e. below 2.5

42. If you are less than very satisfied with your current GPA, how many extra hours per week are you willing and able to spend studying to achieve the GPA with which you would be very satisfied, assuming you had the self-management/time-management skills that would help you to do so?
   a. 0
   b. 1-3
   c. 4-7
   d. 8-11
   e. 12 or more

43. Last semester, how many hours per week did you study, outside of class?
   a. 0
   b. 1-3
   c. 4-7
   d. 8-11
   e. 12 or more

44. Last semester, how many hours per week did you work (i.e. for $, as a parent, as a homemaker, etc.)?
   a. 0-10
   b. 11-20
   c. 21-30
   d. 31-40
   e. >40
45. Could you have afforded to go to school, if you had not worked?
   a. Not applicable
   b. Yes
   c. No

46. How many classes did you miss last semester because you just blew them off?
   a. Not applicable
   b. 0
   c. 1-3
   d. 4-7
   e. 8 or more

47. What percentage of your assigned readings did you complete last semester?
   a. N/A
   b. 0-25
   c. 26-50
   d. 51-75
   e. 76-100

48. What percentage of your assigned homework did you complete last semester?
   a. N/A
   b. 0-25
   c. 26-50
   d. 51-75
   e. 76-100

49. How many assignments did you turn in late, for reasons other than illness last semester?
   a. Not applicable
   b. 0
   c. 1-3
   d. 4-7
   e. 8 or more

50. How many times did you make flashcards before you took a course w/Malott?
   a. N/A
   b. 0
   c. 1-3
   d. 4-7
   e. 8 or more
51. How many times have you made flashcards after you took a course with Malott?
   a. N/A
   b. 0
   c. 1-3
   d. 4-7
   e. 8 or more

52. This was a fairly long questionnaire. Was it too long or O.K.?
   a. Too long
   b. Just a little long
   c. O.K.
   d. Just a little short
   e. Too short

Questions 53-55 are fill in the blank. Use a separate piece of paper to answer these questions.
53. What is the most successful study technique you use?

54. What’s a study technique you wish you could get yourself to use more often?

55. List three goals (if you can) that you would really like to achieve but you would have to use self-management in order to do it. In other words, procrastination and poor time management are preventing you from achieving these goals. These goals should be serious goals, that you have really thought about (i.e. do not put down you want to be president of the United States of America). If you have no goals, write, “none.”
Appendix E

Self-Management Survey
Self-Management Survey

Performance Contract:
On what behavior did you do your self-management project?

What was the PM contingency that you added?
(loss of $5.00 per day, getting to watch TV each time you did it, etc)

What date did you begin your project?

How many days per week did you have to make the response?
1  2  3  4  5  6  7

Did you make any changes to your project (such as performance manager, raising or lowering your criteria, changing the outcome) and if so, were they effective?

Did you keep track of any other measures that would have been affected by your project? (For example, weight as a result of exercising)

How important was accomplishing the goal of your self-management project?
1  2  3  4  5
Very important Not important at all

In your opinion, was your self-management project successful in terms of helping you meet your goals?
1  2  3  4  5
Very Successful Completely unsuccessful

Was it harder to manage your own behavior than you thought it would be?
1  2  3  4  5
Much easier Much harder

Performance Manager:
Who was your performance manager?
(friend, roommate, classmate, boy/girlfriend)

How many days per week were you CONTRACTED to meet with your performance manager?
1  2  3  4  5  6  7

How many days per week did you ACTUALLY meet with your performance manager?
1  2  3  4  5  6  7

For approximately how many weeks were you SUPPOSED to meet with your performance manager?

For approximately how many weeks did you ACTUALLY meet with your performance manager?
Was your performance manager effective in keeping you on track with your project?
1  2 3 4 5
Very much so Not at all

What made (or would have made) your performance manager effective in keeping you on track?

What made (or would have made) your performance manager harmful to keeping you on track?

**General Questions:**
In what year of school are you?

How valuable was doing a self-management project in learning about the management of human performance?
1  2 3 4 5
Very valuable Not valuable at all

Have you already taken the GRE?

If you have not taken the GRE, do you plan on taking it?

If you do plan on taking the GRE, are you currently studying for it?

If you are currently studying for the GRE, how many hours per week do you study?

**Integrity:**
When charting and presenting your data, have you been honest in your information?
1  2 3 4 5
Completely honest Completely dishonest

Approximately how many weeks were you SUPPOSED to pay a fine (or other penalty)?

Approximately how many weeks did you ACTUALLY pay a fine (or other penalty)?

Approximately how many times did you report false data (including overestimating your accomplishments)?

**Comments/Suggestions:**
Appendix F

Transfer Survey
Transfer Survey

At any time during this semester, did you do any self-management projects other than the one that’s required for this class?

Yes No

If yes, what behavior(s) did you manage?

If yes, how useful is self-management in helping you improve those behaviors?

1  2  3  4  5
extremely useful completely useless

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Appendix G

Maintenance Survey
Maintenance Survey

1. Since completing PSY 460 or PSY 610, have you continued with your self-management project or started a new one? If you answered no, go to question #4.

2. Why did you continue?

3. What are your results? Do your data show success or do they need improvement?

If you answered no to question one, please answer these questions

4. Why didn’t you continue using self-management procedures?

5. Would you consider using self-management procedures in the future?

6. What would encourage you to use self-management procedures and keep them going?
BIBLIOGRAPHY


