

INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps.

ProQuest Information and Learning
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
800-521-0600

UMI[®]

CSP-2

SELF-MONITORING EFFICACY FOR WEIGHT LOSS
AS A FUNCTION OF GOAL-SETTING
AND MONITORING UNIT

by Pierre Baron

Thesis presented to the School of
Graduate Studies of the University
of Ottawa as partial fulfillment
of the requirements for the degree
of Doctor of Philosophy



Ottawa, Canada, 1978

UMI Number: DC52508

INFORMATION TO USERS

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleed-through, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

UMI[®]

UMI Microform DC52508

Copyright 2007 by ProQuest LLC

All rights reserved. This microform edition is protected against unauthorized copying under Title 17, United States Code.

ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106-1346

ACKNOWLEDGMENTS

This thesis was prepared under the supervision and guidance of Assistant Professor Robert Watters, Ph. D., of the Faculty of Psychology, University of Ottawa. His resourcefulness and availability were invaluable to the development and completion of this work.

The author is also indebted to Professors Henry P. Edwards, Ph. D., and Raymond H. Shevenell, Ph. D., of the Faculty of Psychology, University of Ottawa, and Associate Professor Hubert Laforge, Ph. D., of the School of Psychology, Laval University, for their helpful advice and suggestions.

The author also wishes to express his sincere gratitude to his wife Therese Preston-Baron for her moral support, encouragement, and day to day interest.

Further thanks are reserved for the Quebec Department of Education for the financial support provided during the years of graduate school.

CURRICULUM STUDIORUM

Pierre Baron was born April 23, 1945, in Sainte-Foy, Quebec. He received the Bachelor of Arts degree in 1966, the Bachelor of Psychology degree in 1971, and the Master of Psychology degree in 1973, all three from Laval University, Quebec. The title of his Master's thesis was Les présupposés à une approche existentielle et humanistique en psychologie.

TABLE OF CONTENTS

	page
LIST OF TABLES	vi
LIST OF FIGURES	vii
ABSTRACT	viii
Chapter	
I. INTRODUCTION	1
Self-monitoring	1
Self-monitoring process	25
Self-monitoring and weight control	42
II. PILOT EXPERIMENT	50
Method	52
Results	58
Discussion	68
III. EXPERIMENT 1	70
Method	73
Results	79
Discussion	86
IV. EXPERIMENT 2	88
Method	89
Results	93
Discussion	99
V. QUESTIONNAIRE DATA	101

VI. GENERAL DISCUSSION	105
------------------------	-----

REFERENCES	125
------------	-----

Appendix

A. Advertisement for Pilot Experiment	134
B. Prequestionnaire for Pilot Experiment	135
C. Form of Adherence of Subjects to Pilot Experiment	137
D. Caloric Intake Monitoring Procedure: Pilot Experiment and Experiment 1	138
E. Postquestionnaire for Pilot Experiment	149
F. Procedure for the Second Phase of the Program in All Experiments	153
G. Restraint Monitoring Procedure: Pilot Experiment and Experiment 2	166
H. Advertisement for Experiment 1 and Experiment 2	176
I. Prequestionnaire for Experiment 1 and Experiment 2	177
J. Form of Adherence of Subjects to Experiment 1 and Experiment 2	180
K. Postquestionnaire for Experiment 1 and Experiment 2	181
L. Tables of Daily Maintenance Calories	186

LIST OF TABLES

Table	page
1. Average Percentage Body Weight at Each Measurement Point for All Groups: Pilot Experiment	59
2. Summary of Two-way Analysis of Variance: Pilot Experiment	60
3. Summary of Trend Analysis: Pilot Experiment	63
4. Average Percentage Body Weight at Each Measurement Point for All Groups: Experiment 1	80
5. Summary of Two-way Analysis of Variance: Experiment 1	81
6. Summary of Trend Analysis: Experiment 1	84
7. Average Percentage Body Weight at Each Measurement Point for All Groups: Experiment 2	94
8. Summary of Two-way Analysis of Variance: Experiment 2	95
9. Summary of Trend Analysis: Experiment 2	98

LIST OF FIGURES

Figure	page
1. Mean Percentage Body Weight from Pretreatment to Week 4 across Experimental Groups: Pilot Experiment	61
2. Mean Percentage Body Weight from Pretreatment to Week 4 across Experimental Groups: Experiment 1	83
3. Mean Percentage Body Weight from Pretreatment to Week 4 across Experimental Groups: Experiment 2	97

ABSTRACT

A series of three experiments were conducted to investigate the efficacy of self-monitoring for inducing weight loss as a function of goal-setting and unit of behavior monitored. The purpose of the pilot experiment was to provide a preliminary view of the usefulness of restraint monitoring as compared to caloric intake monitoring for weight reduction, of the contribution of goal-setting instructions to self-monitoring effectiveness, and of the use of implicit as compared to explicit goals in combination with restraint monitoring. Experiment 1 and Experiment 2 were both designed to look at the influence of various goal levels on the effects of self-monitoring, with the difference that caloric intake and restraint served as the unit of monitoring in Experiment 1 and Experiment 2 respectively. The analysis of the results indicated that restraint monitoring was as effective as caloric intake monitoring for inducing weight loss at the end of a 4-week period, that the effects of self-monitoring as a function of goal-setting varied according to the monitoring unit utilized, that the use of implicit goals in combination with restraint monitoring produced the same effects as the use of explicit goals, and that different levels of either caloric intake or restraint goal did not differentially influence self-monitoring effectiveness. The implications of these results were discussed and suggestions for follow-up research were proposed.

INTRODUCTION

The research reported in this thesis had as its purpose the investigation of the effectiveness of the behavioral technique of self-monitoring as a method of inducing weight loss in adults, with particular attention to the variables of goal-setting and unit of behavior monitored.

The first chapter consists of three sections. The first, self-monitoring, defines the technique and reviews the literature on its use. The second section introduces a widely used model of the self-monitoring process and discusses some of the implications of the model. The third section reviews the literature on the application of self-monitoring to weight control and summarizes the main issues investigated by the three experiments undertaken.

Self-Monitoring

When studying the behavior of individuals in applied settings it is common to use behavioral observers who sample and record some aspect of the behavior of the target subject according to some predefined scheme. If the target subject is the observer then we speak of the process as self-monitoring.

Initially self-monitoring was used to provide data to assess the effectiveness of behavior modification strategies (Kanfer & Phillips, 1970; Simkins, 1971). Subsequently some controlling effects of self-monitoring were noticed and self-monitoring was investigated as an

intervention technique (for a review, see Kazdin, 1974a; Nelson, 1977; Thoresen & Mahoney, 1974). Self-monitoring is now recognized as a complex technique in itself that can serve not only as part of an assessment procedure but also as a control procedure.

The recent research on the use of self-monitoring as a control procedure suggests that its influence may result in substantial behavior change. Self-monitoring has been found effective in reducing the frequency of a number of behaviors, including smoking (McFall, 1970; McFall & Hammen, 1971; Rutner, 1967), alcohol consumption (Sobell & Sobell, 1973), disruptive talking in a classroom (Brodén, Hall, & Mitts, 1971), face-touching (Lipinski, Black, Nelson, & Ciminero, 1975; Lipinski & Nelson, 1974; Nelson, Lipinski, & Black, 1975, 1976a), respiration rates (Epstein, Miller, & Webster, 1976), blood pressure (Carnahan, 1973), reported hallucinations (Rutner & Bugle, 1969), weight (Bellack, Rozensky, & Schwartz, 1974; Bellack, Schwartz, & Rozensky, 1974; Romanczyk, 1974; Romanczyk, Tracey, Wilson, & Thorpe, 1973; Rozensky & Bellack, 1976), overt and covert paranoid behavior (Williams, 1976), inappropriate motor behavior (Maletzky, 1974), mouth biting (Ernst, 1973), fingernail biting (Horan, Hoffman, & Macri, 1974), vocal tics (Thomas, Abrams, & Johnson, 1971), nose squeezing (Jason, 1976), whining (Kunzelmann, 1970), insomnia (Jason, 1975), and the frequency of headaches (Armentrout, 1973).

Self-monitoring has also been shown to be effective in increasing a number of behaviors, including study behavior or aspects of study behavior (Brodén et al., 1971; Johnson & White, 1971; Kazlo, 1976; Mahoney, Moore, Wade, & Moura, 1973; Olson, 1975; Richards, 1975; Richards, McReynolds,

Holt, & Sexton, 1976), on-task behavior in elementary school children (Glynn & Thomas, 1974; Thomas, 1976), correct responses and self-rated motivation to perform in a match-to-sample laboratory analogue task (Wade, 1974), class participation (Gottman & McFall, 1972) parental attention to appropriate child behaviors (Herbert & Baer, 1972), swimming practice attendance and performance (McKenzie & Rushall, 1974), work and comments evoking staff praise in adolescent girls in a maximum security unit for offenders (Seymour & Stokes, 1976), time spent in a room by a claustrophobic individual (Leitenberg, Agras, Thompson, & Wright, 1968), masculine play in a pre-transsexual male child (Rekers & Varni, 1977a, 1977b), and the frequency of talking, participation in lounge activities, and tidiness of the bedrooms in adult retardates (Nelson, Lipinski, & Black, 1976b). Behavior changes produced by self-monitoring in single-person situations have been replicated in a dyadic situation (Cavior & Marabotto, 1976).

While repeatedly trying to replicate the basic finding that self-monitoring can influence the occurrence of the target behavior, these studies have also identified and investigated a number of variables which affect the changes in behavior produced by self-monitoring. These variables include explicit reinforcement for behavior changes, valence attached to the monitored behavior, concurrent behavior, form (or unit) of monitoring, schedule of monitoring, timing of the act of self-monitoring, motivation of subjects to change the target behavior,

expectancy of direction of behavior changes, incompatible response training, and information feedback. The findings with respect to each of these variables will now be discussed.

Before starting this discussion, a brief comment on how variables have usually been investigated seems appropriate. In most studies the directly manipulated variable referred to instructions given to the subjects by the experimenter. For instance, the experimenter instructed subjects to monitor some target behavior continuously as opposed to intermittently, or he gave to subjects in various groups some instructions which were supposed to vary the valence of the target behavior (each group being exposed to a different instruction set). The experimenter, however, did not necessarily verify (for instance, by direct observation or by giving a postquestionnaire) that subjects actually monitored the target behavior continuously or intermittently, or that they valued the target behavior differentially. In other words, the experimenter did not necessarily check that instructional sets actually influenced subjects' behavior. This is to say that many findings to be reported in what follows referred mainly to instructions on monitoring and/or monitored behavior given to subjects by the experimenter but not to the actual change the instructions did bring about in subjects' behavior. This change unless it is measured can only be inferred (see Biglan & Kass, 1977, for a thorough discussion of the topic).

The effects of self-monitoring have been shown to be affected by explicit reinforcement, by the experimenter, for behavior changes in a particular direction. Lipinski et al. (1975) demonstrated that differential

monetary reinforcement of either behavior change or accuracy enhanced differentially controlling effects and accuracy of self-monitoring. Face-touching was reduced significantly more in subjects who were reinforced for decreasing their face-touching than in subjects who were rewarded for increasing their reliability. Layne, Rickard, Jones, and Lyman (1976) showed that simultaneous reinforcement of behavior change and accuracy enhanced both. Their study consisted of four phases: a prebaseline measure of clean-up behavior, the self-monitoring of cleaning, a continual accuracy check in which a reinforcement was contingent upon criterion self-recording accuracy and cleaning, and a variable ratio accuracy check in which the contingencies of the previous phase were put on a variable ratio schedule. They found that self-recording alone did not maintain an increase in clean-up behaviors, that simultaneous rewarding of both cleaning and accurate self-monitoring on a continuous schedule produced a significant increase in both, and that a variable schedule of reinforcement did maintain high levels of both cleaning and accurate self-monitoring. Layne et al.'s results replicated those of Lyman, Rickard, and Elder (1975) who showed cleaning and self-monitoring accuracy to be both improved and maintained simultaneously through continuous observer verification and reinforcement. Finally, it has been found that providing reinforcers for accurate self-monitoring could also influence the controlling effects of self-monitoring. On the one hand, Nelson et al. (1976b) demonstrated that retardate subjects, when reinforced for high rates of agreement between their self-recording and observations by trained observers, increased their talking and object-touching over the

level of self-monitoring-without-reinforcement and decreased their face-touching below the level of self-recording-without-reinforcement. A postquestionnaire, however, revealed that the subjects were unable to discriminate between being reinforced for reliable self-monitoring and being reinforced for changes in the frequency of the target behaviors. On the other hand, Epstein, Webster, and Miller (1975) found that subjects requested to self-monitor their respiration decreased their response rates from baseline when no monetary incentive for accurate monitoring was provided but not when a monetary incentive for accurate recording was given. Epstein et al. (1975) noted that

The relative increase in respiration rate during the reinforced self-monitoring conditions compared to nonreinforced self-monitoring may be because the reinforcement contingencies were designed so that the rate of reinforcement would be increased by increasing the rate of the response to be monitored. (p. 664)

Self-monitoring effects have been found to be influenced by the valence attached to the response that is selected as the target behavior. Kazdin (1974b) gave instructions which were intended for inducing a positive, negative, or neutral valence upon a target behavior (the use of "I" and "we" pronouns in a sentence-construction task) to self-monitoring subjects and no-self-monitoring subjects. Self-monitoring subjects were to count on a digital counter the number of sentences they used beginning with I or we, whereas the no-self-monitoring subjects did not record their responses or have access to the counter. Kazdin found that the instructions on the valence of the behavior determined the direction of behavior change: positive valence instructions led to an increase, negative valence instructions led to a decrease, and neutral valence instructions led to no

change in the target behavior. Such effects were shown even in the no-self-monitoring condition but were more pronounced in the self-monitoring condition. A postexperimental questionnaire indicated that subjects responded differentially to the valence manipulations. Similarly, Cavior and Marabotto (1976) investigated three types of monitoring (external-agent monitoring, self-monitoring prior to the occurrence of behavior, self-monitoring after the occurrence of behavior) of self-selected verbal target behaviors of different valence (positive, negative, neutral) in heterosexual dyads of college students. They found that the valence of the target behavior influenced the direction of changes produced by the three types of monitoring. Behaviors selected by subjects as positively valenced significantly increased, behaviors selected as negatively valenced significantly decreased, and behaviors selected as having a neutral valence did not change.

Sieck and McFall (1976) also tested the hypothesis that the direction of behavior change is a function of the valence of the target behavior (an eyeblink response). The design allowed for the separation of the effects of the target behavior valence from the effects of self-monitoring per se. The results showed that valence-induction instructions alone, without self-monitoring instructions, produced no behavior changes. Similarly, self-monitoring instructions alone, without the attribution of either a positive or negative valence to eyeblinks, did not produce significant changes in the target behavior. However, the combination of the two (valence and self-monitoring instructions) produced effects, and the direction of these effects was a function of the target behavior

valence. Positive valence and self-monitoring instructions increased the target behavior, whereas negative valence and self-monitoring instructions decreased the target behavior. No postquestionnaire was given to examine whether or not subjects responded differentially to the valence manipulations. These results corroborated Kazdin's (1974b) finding regarding the influence of the target behavior's valence in determining the direction of self-monitoring effects, despite the fact that valence instructions alone had no influence on behavior (as compared to the weak effect reported by Kazdin).

Some equivocal results were obtained by Nelson et al. (1976b) who compared the effects of self-monitoring on three target behaviors of different valence (talking, positive valence; face-touching, negative valence; object-touching, neutral valence) in adult retardates. Self-monitoring increased the frequency of the positive behavior, talking. With regard to the negative behavior, results were less clear-cut in that self-monitoring decreased the frequency of face-touching for only three subjects out of five. Self-monitoring reduced the frequency of the neutral behavior, object-touching. This reduction, according to the authors, might have been due to the act of self-monitoring itself in that it interfered with the behavior of touching objects and so reduced previous object-touching rates. A postquestionnaire administered orally and serving as a check on the experimental manipulations revealed that talking was considered as a "good" behavior whose frequency should be increased and that face-touching was viewed as a "bad" behavior whose frequency should be decreased. With respect to object-touching, subjects'

verbalizations were inconsistent.

The valence of the target response thus appears to determine the direction of behavior change effects generated by self-monitoring. In addition, valence would seem to be differentially related to the magnitude of these effects. In Sieck and McFall's (1976) study, for instance, the increased eyeblink rate of the positive valence self-monitoring groups was more pronounced than the decreased eyeblink rate of the negative valence self-monitoring groups. It has also been found that response increases can more readily be produced than response decreases with self-monitoring (e.g., Gottman & McFall, 1972; McFall, 1970). Possibly, in general, response increases are positively valenced and response decreases are negatively valenced. There is then some suggestion that self-monitoring can foster more behavior change with positively valenced target behavior than with negatively valenced target behavior.

The behavior change effects of self-monitoring were evaluated as a function of engaging in concurrent behaviors. In a study designed to examine issues concerning both accuracy and controlling effects of self-monitoring (Epstein et al., 1975), each subject was exposed to three experimental conditions: reinforced self-monitoring, nonreinforced operant responding, and a combination of reinforced self-monitoring and nonreinforced operant responding. During the self-monitoring phase the subject recorded his respiratory responses by pressing a lever on a Lafayette Human Response Key once every time he inhaled and was reinforced with money for accurate recording. The operant responding phase, during which there was no monitoring of respiration, consisted of responding on a multiple fixed interval 15"-variable interval 15" schedule to produce steady states of lever

pressing on a BRS Foringer/Lehigh Valley Operant Console. During the final phase in which the subject was instructed to self-monitor his respiration and perform the operant response, money was earned for accurate self-monitoring but not for the operant task. The results showed that the concurrent behavior subjects were performing (during the final phase) did not influence the effects of self-monitoring for the simple reason that there were no such effects: respiration rates were constant during each condition. Moreover, when subjects performed the concurrent operant task concurrently to self-monitoring, the operant performance was not affected as a function of self-monitoring, even if a greater incentive was provided for accurate self-monitoring than for operant responding.

In a similar subsequent study (Epstein et al., 1976), subjects were also exposed to three consecutive experimental conditions: self-monitoring where accuracy was not reinforced, operant responding where lever pressing was reinforced, and a combination of nonreinforced self-monitoring and reinforced operant responding. In this second study self-monitoring effects were found; the target behavior (respiration rate) decreased similarly in both nonreinforced self-monitoring alone and nonreinforced self-monitoring plus reinforced operant responding. These contrasting results might have been due to the fact that in the first study self-monitoring accuracy was reinforced while in the second study it was not. As noted earlier, reinforcing accuracy can influence the controlling effects of self-monitoring.

Another variable which appears to influence the effects of self-

monitoring is the form (or unit) of self-monitoring. Gottman and McFall (1972) demonstrated that subjects who were asked to record the number of times they talked during a class discussion increased their classroom participation, whereas subjects who were required to record the number of times they wanted to talk but did not, failed to increase their classroom participation. Similarly, it was shown that subjects requested to record the number of cigarettes they smoked did not decrease smoking, while subjects asked to count the number of times they resisted smoking urges did decrease smoking (McFall, 1970). McFall and Hammen (1971) found that four different forms (or units) of self-monitoring were equally effective in reducing smoking. These self-monitoring forms included self-monitoring of the number of cigarettes smoked, self-monitoring of the number of times subjects could not resist smoking, self-monitoring of the number of times subjects successfully resisted smoking, and the last condition with the additional instruction of resisting 20 temptations per day.

The results obtained by McFall (1970) and Gottman and McFall (1972) might refer to the finding discussed earlier to the effect that self-monitoring would seem to produce more pronounced behavior change with positively valenced target behaviors than with negatively valenced target behaviors. Thus, for instance, subjects required to record the number of times they resisted smoking (positively valenced behavior) might be expected to show a greater change in their smoking behavior than subjects requested to monitor the number of cigarettes they smoked (negatively valenced behavior). On the basis of such an argument, however, the different forms of monitoring used by McFall and Hammen (1971) should have yielded

different results but they did not.

The schedule of monitoring has been shown to influence the effectiveness of self-monitoring. Investigators have compared continuous with intermittent schedules of monitoring. Mahoney, Moore, Wade, and Moura (1973) found that subjects asked to record every correct response (continuous monitoring) during academic review increased their study time more than subjects required to record every third correct response (intermittent monitoring). Frederiksen, Epstein, and Kosevsky (1975) showed that subjects instructed to monitor their smoking rates continuously reported a greater smoking reduction than subjects requested to record their smoking rates intermittently (either daily recording or weekly recording). According to Frederiksen et al. (1975), one potential explanation for the greater controlling effects of continuous self-monitoring would refer to the demands of the recording procedure:

The demands of recording are important because the recording procedure is imposed on ongoing behavior. It is expected that as the time and effort demanded by a recording procedure increase, concurrent behaviors will be disrupted. This disruption is likely to reduce the opportunities for available reinforcement of the ongoing behavior, thus resulting in response cost during each recording episode. The subject can avoid this response cost by decreasing the frequency of the response to be recorded. (p. 262).

Such an explanation is questionable given the finding already reviewed relative to the influence of self-monitoring on the performance of a concurrent operant task (Epstein et al., 1975). This finding did not suggest that the performance of concurrent behaviors might be affected as a function of self-monitoring.

Self-monitoring effectiveness has also been shown to be influenced by the timing of the act of self-monitoring in relation to the behavior being monitored. Bellack, Rozensky, and Schwartz (1974) reported that monitoring planned intake early in a behavior chain (i.e., prior to eating) was more effective in producing weight loss than posteating monitoring. They argued that when one is attempting to reduce the frequency of response the self-monitoring after stimulation but prior to the response interrupts the behavior sequence and allows for the alternate behavior of self-control to occur. Self-monitoring after the response, on the other hand, would not break the stimulus-response chain. Their results were partially confirmed by those of Cavior and Marabotto (1976) who compared the effects of three types of monitoring of self-selected verbal target behaviors of different valence in dyadic interactions. They showed that prebehavior monitoring reduced the negatively valenced verbal behaviors significantly more than postbehavior monitoring and external-agent monitoring. Prebehavior monitoring reduced the positively valenced verbal behaviors less (although not significantly) than postbehavior monitoring and external-agent monitoring. Cavior and Marabotto (1976) argued that

It is possible that ... [prebehavior monitoring] was not more effective than ... [postbehavior monitoring] and external-agent monitoring in the positive valence condition because the stimulus-response chain is not interfered with when monitoring positive behaviors. Further research on the monitoring of positive behaviors prior to the occurrence of the behavior is required before any definite conclusions can be reached on this point.
(p. 75)

The results of Bellack, Rozensky and Schwartz (1974) also received suggestive support from Rozensky's (1974) case study where self-monitoring prior to the occurrence of the target behavior (cigarette consumption) was more effective than self-monitoring subsequent to the occurrence of the target behavior. This study, however, involved the confounding factor of the sequential use of postmonitoring and premonitoring. The only results contrasting with those of Bellack, Rozensky, and Schwartz (1974) are those of Karoly and Doyle (1975) whose study showed no differential effect for the timing of self-monitoring on daily smoking rates. Prebehavior (urges) monitoring was not more effective in reducing smoking than postbehavior (the number of completed cigarettes) monitoring. It thus appears that the point at which self-monitoring would lead to maximal disruption of the behavior chain still remains to be ascertained.

The motivation of subjects to change the target behavior has been shown to be an important variable in achieving the behavior change effects of self-monitoring. In a study which involved a "motivated" group (i.e., subjects who signed up for a project advertised for "Individuals who want to quit smoking") and a "nonmotivated" group (i.e., subjects who registered for a project advertised for "Individuals who are cigarette smokers"), Lipinski et al. (1975) showed that self-monitoring of instances of smoking only reduced the reported cigarette intake of subjects who were motivated to stop smoking. Similarly, McFall and Hammen (1971) found that four forms of self-monitoring successfully reduced smoking when subjects were motivated to quit smoking. Prior to the introduction of the self-monitoring procedures the subjects rated their motivation to

quit on a 7-point scale with 7 representing the highest motivation. The subjects' self-reported motivation prior to treatment correlated significantly with whether or not they actually stopped smoking by the end of treatment. McFall (1970) also showed that monitoring of cigarette consumption by smokers who were not necessarily motivated to stop smoking failed to decrease smoking. These smokers were student subjects who chose to participate in various experiments in lieu of writing a paper during a summer session.

It has been demonstrated that instructions designed to create an expectancy of improvement can enhance therapy outcomes. Borkovec (1972), for instance, reported that the manipulation of instructions designed to establish a positive expectancy of improvement strongly affected the fear and avoidance behavior of analogue subjects treated by systematic desensitization and implosive therapy for snake phobia as compared to the manipulation of instructions designed to establish a neutral expectancy. Similarly, Oliveau, Agras, Leitenberg, Moore, and Wright (1969) ran a study to assess the relative role of positive expectancy instructions and positive verbal reinforcement (praise) in determining the effectiveness of systematic desensitization for curing subjects with marked fear of snakes. They found that positive expectancy instructions influenced the outcome of systematic desensitization and that positive verbal reinforcement did not. On the basis of such findings, it has been hypothesized that self-monitoring effectiveness may be influenced in the same way. Expectancy of direction of behavior change may have some potential in controlling behavior changes produced by self-monitoring. Until now, however, studies have yielded contradictory results.

Nelson et al. (1975) required college students to monitor their face-touching (in the classroom) under different expectancy conditions (including increase, decrease, no change, and no expectancy). They found that expectancy was a weak variable that did not alter the direction of behavior changes produced by self-monitoring of face-touching. A postquestionnaire indicated that subjects responded differentially to the expectancy manipulations. Katz, Thomas, and Williamson (1976), on the other hand, showed that the effects of self-monitoring were influenced by expectancy instructions. While self-monitoring alone did not reduce the monitored response (fingernail biting), self-monitoring plus instructions designed to create an expectancy that improvement would result from using that procedure did reduce nailbiting. No postquestionnaire was used to check on subjects' response to expectancy manipulations. Karoly and Doyle (1975) also showed that cigarette consumption monitoring subjects with high expectancy for smoking reduction reduced their smoking rates to a greater extent than cigarette consumption monitoring subjects with low expectancy. An expectancy check revealed that subjects responded differentially to the experimental manipulations. Karoly and Doyle (1975) argued that "the covariation of high expectancy and increase in therapeutic outcome should not be interpreted as implying an explanatory role for expectancy", and suggested that "high expectancy instructions should be viewed as a motivational operation, one that may augment the effort, precision, and self-consequation shown by subjects in a self-monitoring task" (p. 354).

Training the subject to make a response incompatible with the target behavior, while self-monitoring, was investigated by McNamara (1972).

In this study nailbiting served as the target behavior. With respect to the alternative response training, subjects were instructed to tap their fingers every time they started to bite their nails and to pull their hand away from their mouth every time their fingers touched their lips. A comparison of self-monitoring with and without alternative response training showed that alternative response training did not add to the utility of self-monitoring. Katz et al. (1976) also looked at the same response class (nailbiting). They compared the effects of self-monitoring alone, self-monitoring in combination with an improvement expectancy, and self-monitoring in combination with an improvement expectancy plus training in responses incompatible with nailbiting. The incompatible responses were either to place one's arms at the side and clench one's fists, or grasp onto a suitable object for a short period of time (every time one found oneself biting or picking one's nails or whenever one had the urge to do so). Katz et al.'s results were consistent with those of McNamara (1972) in that the addition of such incompatible response training did not increase the effects of self-monitoring.

Information feedback as a variable potentially responsible for the behavior change effects of self-monitoring has also been examined. In the present context, information feedback refers to the information an individual receives as to how well he is doing by observing the record of his self-monitoring responses. Information feedback appears to be an important component of self-monitoring and may contribute to its effectiveness.

Kazdin (1974b) examined the role of feedback on self-monitoring in

a study using a Taffel-type sentence-construction task in which the frequency of sentences starting with I or we served as the target behavior for self-monitoring. Two levels of feedback were manipulated by allowing or not allowing subjects access to information on a digital counter provided for self-monitoring. Subjects receiving feedback counted their responses on the digital counter and could view the cumulative number of times they used I and we on the display of the counter. Subjects receiving no feedback also counted their responses on the digital counter but could not view the results of their counting. Greater self-monitoring effects (i.e., greater use of I and we pronouns) were found in subjects who received the visual feedback as compared to subjects who did not receive such a visual feedback. Similarly, in a match-to-sample laboratory analogue task in which a linear teaching machine programed with 10 sets of match-to-sample items was employed, Wade (1974) found that subjects who made cumulative recordings on a counter of either correct or incorrect responses attained a greater number of correct responses as well as a greater proportion correct than subjects who received simple performance feedback. The latter subjects, who had no counter available, monitored their individual correct or incorrect responses (i.e., they simply recorded a W or R whenever their answers to the items were wrong or right respectively).

Richards et al. (1976) conducted a study involving self-monitoring of study habits with volunteer subjects who were enrolled in a psychology course and who were concerned about their study habits (following a brief description of the treatment program, they were asked to sign up for

treatment only if they thought they would attend every treatment session and they thought they had serious problems with their study habits and academic performance). Subjects were randomly assigned to a no-treatment control group, a study skills advice group, or one of six self-monitoring plus study skills advice groups. The self-monitoring plus study skills advice groups were involved in one of six forms of self-monitoring: two information feedback conditions were crossed with three conditions of self-administered consequences. With regard to the information feedback manipulation, it entailed high information feedback (i.e., self-monitoring in terms of fine, cumulative measures) versus low information feedback (i.e., self-monitoring in terms of gross, noncumulative measures). Subjects in the high information feedback self-monitoring groups were dichotomized (after the study was over) into those who were informed and those who were uninformed about the extent or amount of their studying; this dichotomization was made on the basis of a match between their pretreatment study behavior estimates (hours per week) and what they actually self-recorded the first week of treatment. (Subjects in the low information feedback self-monitoring groups were not analysed because their recording was too gross for categorization). Grade, questionnaire, and self-monitoring data served as outcome measures. It was expected that if information feedback is one of the components responsible for self-monitoring effectiveness, then subjects who were uninformed about their current study habits would benefit more from self-monitoring than informed subjects. Actually, Richards et al. (1976) found that uninformed subjects did benefit more from self-monitoring than informed subjects in that they increased more their study

behavior. The authors, however, failed to demonstrate that self-monitoring effects were enhanced by increasing the information feedback in the self-monitoring procedures. There was no difference in the outcome measures between high information feedback self-monitoring groups and low information feedback self-monitoring groups. Thus, even if all these studies suggest that information feedback is an important variable for controlling the effects of self-monitoring, the issue of quality and quantity of such feedback still remains to be clarified.

Finally, a word must be said about the role of external control as an adjunct to self-monitoring. Usually, in studies (or programs) using the self-monitoring technique, the experimenter (or therapist) gives information and instructions to start the experiment (or program) and then, typically, meets periodically with the subject until the target behavior has been modified or the study (or program) is over. In a weight reduction program using self-monitoring, Bellack, Schwartz, and Rozensky (1974) varied the conditions of contact with the experimenter. In a first condition, the high contact condition, subjects were required to mail their previous day's record to the experimenter every morning and to report in each week to be weighed, discuss progress, and receive a new supply of envelopes. In a second condition, the mail contact condition, subjects were requested to mail their monitoring records to the experimenter each day. They were also sent each week a new supply of envelopes and a brief note, impersonally reminding them of some aspect of the program. In a third condition, the no-contact condition, subjects had no contact with the experimenter between the orientation and termination

session. The results showed that subjects involved in conditions incorporating continuous contact with the experimenter (high contact and mail contact conditions) lost more weight than subjects involved in the no-contact condition. The authors suggested that the incorporation of external control might be critical in maintaining the use of self-control and that the degree of external control might be less important than the presence or absence of such contact when one is focusing on self-control. They added that external control might serve as a cue rather than as a reinforcer and that this cueing function might be a necessary but not a sufficient condition for changes in behavior.

Bellack, Schwartz, and Rozensky's (1974) results were not corroborated by those of Bellack (1976) who manipulated two levels of experimenter contact (mail contact and no contact) in a study comparing self-monitoring of food intake with self-reinforcement of eating behavior in a weight reduction program. Mail contact subjects were asked to mail their preceding day's monitoring record to the experimenter every day and were sent each week a supply of envelopes for the following week. No-contact subjects were not requested to mail their monitoring records to the experimenter. Differences in weight loss between mail contact subjects and no-contact subjects were not found to be significant.

A finding constantly supported by the studies reviewed until now is that behavior changes produced by self-monitoring do not depend upon accurate or reliable recording on the part of the subject. Self-monitoring has been found to be both reliable (Azrin & Powell, 1969; Mahoney, Moore, Wade, & Moura, 1973; Nelson et al., 1976b; Ober, 1968) and unreliable

(Broden et al., 1971; Cavior & Marabotto, 1976; Fixsen, Phillips, & Wolf, 1972; Herbert & Baer, 1972; Risley & Hart, 1968). Even with low reliability significant behavior changes have been shown (e.g., Broden et al., 1971; Epstein et al., 1976; Herbert & Baer, 1972), and such changes were reliable (e.g., Lipinski et al., 1975; Lipinski & Nelson, 1974; Nelson et al., 1975). Reliable or accurate recording did not ensure behavior changes (e.g., Powell & Azrin, 1968). It has been argued that lack of reliability may be unimportant when self-monitoring is used primarily as an intervention technique (Lipinski et al., 1975).

The behavior change effects of self-monitoring, when compared with those of external observation or monitoring, are equivocal. On the one hand, Nelson et al. (1976a) showed that even if external monitoring reduced the frequency of the target behavior, face-touching, self-monitoring produced more reduction in face-touching and this reduction was more consistent across subjects. Similar suggestive results were obtained by Sieck and McFall (1976). On the other hand, Kazdin (1974b) and Cavior and Marabotto (1976) found no difference in the effects of self-monitoring versus external monitoring.

Although studies have clearly demonstrated substantial behavior changes produced by self-monitoring, self-monitoring has often been confounded with other procedures that in themselves could account for behavior changes (Carnahan, 1973; Glynn & Thomas, 1974; Herbert & Baer, 1972; Horan et al., 1974; McFall & Hammen, 1971; Rehm & Marston, 1968; Rekers & Varni, 1977a; Rutner, 1967; Rutner & Bugle, 1969; Seymour & Stokes, 1976; Thomas, 1976; Thomas et al., 1971). For example, Thomas

et al. (1971) used self-monitoring to reduce multiple tics (Gilles de la Tourette syndrome) in a young male adult. Since only one of the tics (vocal tic, vocal sound, or neck tic) could be accurately monitored at one time by an independent observer, each tic was treated in sequence. The subject was asked to count his vocal tics and to report them every 15 minutes to an observer who followed him. The subject was praised for low rates. This procedure produced a rapid decrease of the vocal tic. Self-monitoring combined with reciprocal-inhibition therapy decreased the other two tics. Thomas et al. (1971) concluded that self-monitoring reduced tics. However, with respect to the decreased vocal tic in particular, the effects of self-monitoring alone were not isolated from those of praise (verbal reinforcement). Another example of confounding is to be found in the study done by Rehm and Marston (1968) who included self-monitoring as part of treatments to decrease social anxiety in males. The treatment subjects received involved either self-reinforcement, nonspecific therapy, or no therapy. Self-reinforcement subjects recorded their social interactions with females and gave themselves points contingent upon their performance. In treatment sessions, previous social interactions were praised and future interactions were encouraged by the therapist. The other two groups were given contact with the therapist without self-monitoring or reinforcement. Self-monitoring combined with self-reinforcement and therapist-reinforcement generated greater changes on several measures than the other conditions did. Since all groups had some form of contact with the therapist, self-monitoring might be viewed as a crucial ingredient in the effective

treatment procedure. On the other hand, the specific agent of changes is unclear because self-monitoring was combined with both self-reinforcement and therapist-reinforcement.

Another bothersome aspect of the literature is that the effects of self-monitoring are not constant. Self-monitoring alone did not alter the monitored response in some carefully designed and executed investigations (e.g., Berecz, 1972; Greiner & Karoly, 1976; Hall, 1972; Hoon, 1976; Mahoney, Moura, & Wade, 1973; Spates & Kanfer, 1977; Stollack, 1967). When self-monitoring produces changes in behavior, such changes sometimes attenuate with time (e.g., Broden et al., 1971; Fixsen et al., 1972; Mahoney, 1974a; Rekers & Varni, 1977b; Stuart, 1971), in spite of the fact that other studies have demonstrated effective maintenance using self-monitoring alone (Hall, Hall, Borden, & Hanson, 1975) or self-monitoring combined with reinforcement of subjects' records (Bolstad & Johnson, 1972; Drabman, Spitalnik, & O'Leary, 1973; Glynn, Thomas, & Shee, 1973; Kaufman & O'Leary, 1972).

Despite the fact that self-monitoring (as a behavioral control procedure) as well as the variables which may determine its effectiveness have received increasing attention, most authors agree that it is still unclear why self-monitoring produces behavior changes or how such behavior changes can be enhanced (e.g., Karoly & Doyle, 1975; Katz et al., 1976; Kazdin, 1974a; Mahoney, Moura, & Wade, 1973; Nelson et al., 1976a; Richards et al., 1976; Sieck & McFall, 1976; Spates & Kanfer, 1977). As illustrated by the studies reviewed above (with perhaps the exception of the studies dealing with explicit reinforcement by the

experimenter, valence attached to the target behavior, and schedule of monitoring), one is very often confronted with mixed results which yield only inconclusive evidence with regard to the effect of self-monitoring and the parameters influencing its effectiveness. It would seem that self-monitoring may give rise to behavior changes under specific conditions but these specific conditions need to be more clearly delineated through further investigation. In order to postulate variables which may enhance and maximize self-monitoring effectiveness, it appears useful (if not essential) to examine self-monitoring in the overall context of the self-regulation process. This suggests an examination of the development of self-regulation formulations or models.

Self-Monitoring Process

Historically behavior modification was characterized by a strong emphasis on scientific methodology and functional behavior relationships. It dealt with overt or observable behaviors and relied almost exclusively on the manipulation of environmental stimulation antecedent to and consequent to the behavior to be changed. Behavior modification was, then, synonymous with the application of the principles of classical conditioning (Eysenck, 1960, 1964; Wolpe, 1958) and operant conditioning (Skinner, 1953). This strong emphasis on overt behavior and stimulation was associated with an equally strong reluctance by the early behavior modifiers to deal with and to incorporate covert behaviors or processes into their analysis and explanations of behavior. Such a reluctance was

largely due to the contention that private events such as thoughts, images, memories, etc., unless they could be defined in terms of publicly observable physical responses, were not amenable to scientific study and were, therefore, beyond the scope of a behavioral science. It was also felt that lawful behavioral relationships could be described and utilized without reference to covert processes (not that such processes did not exist, but they were not relevant in a functional analysis of behavior). The former contention was inherited from Watson's (1924) radical behaviorism, the latter was from Skinner's (1953) warnings against unjustified inferences.

While keeping its essential earlier characteristics behavior modification, in its more recent developments, has also emphasized controlled empirical inquiries into covert behaviors or processes. Homme (1965), who categorized covert processes as "coverants" (or covert "operants of the mind"), was among the first to acknowledge the need for controlled empirical investigation in this area. According to him, these coverants could be subjected to experimental control because they were observable to a "public of one" (i.e., their owner). He defended the continuity or homogeneity assumption that covert behaviors can be considered as responses similar to overt behaviors, and that these covert behaviors obey the same empirically derived laws and principles as overt behaviors. Other advocates of this continuity assumption include Skinner (1963), Bandura (1969), Mahoney (1970), and Ullman (1970).

The continuity assumption also implies that covert behaviors, with

regard to their effects on human action, may serve the same functions as overt behaviors. They may serve as antecedent stimulations that cue the occasions for responses (e.g., eating urges, smoking urges). They may serve as target behaviors or responses (e.g., hallucinations, evaluative comparisons). Finally they may serve as consequences of other responses (e.g., self-praise, self-criticism). These various functions of covert behaviors received empirical support from several lines of evidence (see Mahoney, 1974b, for a review).

It is within this context of a broadened perspective in behavior modification that the behavioral study of self-control (viewed in terms of covert processes) has been undertaken and models of self-regulation (also formulated in terms of covert processes) have been developed. The most influential of these models was proposed by Frederik H. Kanfer (1970a; 1970b; 1971; Kanfer & Karoly, 1972; Kanfer & Phillips, 1970). (It must be noted that the terms self-control, self-regulation, and self-management have all been used interchangeably with reference to the topic in question).

Kanfer has conceptualized the self-regulation process as a closed-loop feedback system involving three different stages: self-monitoring, self-evaluation, and self-reinforcement. In the first stage, self-monitoring, the individual systematically observes his own behaviors and keeps a record of the frequency with which he engages in the behavior to be controlled. Thus, he can recognize features of his behaviors and the context in which they occur (i.e., antecedent stimuli and consequences attached to these behaviors). The target behavior to be monitored can

be overt (i.e., publically observable) or covert (i.e., private events observable to the public of one). The second stage, self-evaluation, consists of the individual examining the data he collected and evaluating by comparing the performance level to some social or personal standard or performance criterion. The individual's evaluation of his performance leads to the third and final stage, that is, the delivery of self-reinforcement. The term self-reinforcement, as used by Kanfer, includes both positive and negative self-consequation (i.e., reinforcement and punishment). The reinforcers to be delivered can also be overt or covert. Self-reinforcement (or consequation) is thought of as the result of certain outcomes of discrimination between performance feedback and standard. Thus, self-monitoring initiates a feedback loop in which self-adjusted responses are made until performance matches the standard.

It is important to note that the stages postulated by Kanfer to account for the self-regulation process parallel those involved in any behavior modification strategy. Whether a subject carries on a behavior modification program designed to alter someone else's behavior or carries on a program intended to change his own behavior, the stages are the same. In both cases the behavior change strategy undertaken includes observing some target behavior, evaluating whether this behavior departs from some accepted standard for change, generating appropriate reinforcements, and maintaining the entire process until correction is no longer needed.

In his conceptualization, Kanfer (1970a) suggests the interrelationship between self-monitoring, self-evaluation, and self-reinforcement. In this context, self-monitoring acts as a "crucial trigger" for the whole self-regulation process, and self-evaluation and self-reinforcement are implicit concomitants of self-monitoring. Thus, self-monitoring affects behavior by serving as a discriminative stimulus for self-evaluation and self-reinforcement and setting the occasion for their occurrence. In other words, when an individual is required to self-monitor, Kanfer assumes that he will self-evaluate (by comparing his performance with some standard) and administer (covert or overt) self-reinforcement for his performance.

Specific predictions made by Kanfer from his self-regulation model have been empirically supported by a number of studies reviewed earlier. Thus, for instance, Kanfer (1970a) has speculated that explicit reinforcement could strengthen self-reinforcement to produce behavior changes in desired directions. As already discussed, Epstein et al. (1975), Layne et al. (1976), Lipinski et al. (1975), and Lyman et al. (1975) demonstrated that self-monitoring effects were affected by explicit reinforcement, by the experimenter, for behavior changes in a particular direction. Another example is Kanfer's (1970a) suggestion that the direction of the changes (increase or decrease) generated by self-monitoring could be influenced by the valence attached to the target behaviors. Positively valenced behaviors would be expected to increase in frequency with self-monitoring, whereas negatively valenced behaviors would be expected to decrease in frequency with self-monitoring. Support

for this prediction is to be found in the studies by Cavior and Marabotto (1976), Kazdin (1974b), Nelson et al. (1976b), and Sieck and McFall (1976).

Some support for Kanfer's conceptualization of the self-regulation process has also been provided. Richards et al. (1976) examined the possibility of self-reinforcement being implicitly involved in self-monitoring. They investigated this possibility through manipulation of the quantity and quality of self-reinforcement entailed in the self-monitoring instructions. The self-reinforcement manipulation involved either no instructions on self-reinforcement, or instructions on systematically incorporating covert self-reinforcement (following a positive evaluation of the self-monitoring records) with self-monitoring, or instructions on systematically incorporating covert and overt self-reinforcement with self-monitoring. The results showed that the effectiveness of self-monitoring was not enhanced by the instructions on self-reinforcement. These results are consistent with Kanfer's suggestion that self-reinforcement is an implicit concomitant of self-monitoring; instructions to reinforce can add nothing to the already ongoing evaluation and reinforcement.

Bellack (1976) also studied the issue of self-monitoring and self-reinforcement in relation to Kanfer's model, although his study relied upon a particular speculation of his about the self-reinforcement component. According to Bellack (1976),

When no explicit instructions in the use of SR [self-reinforcement] is provided, it cannot be assumed that a client will administer SR contingently. Therefore, directly instructing a client in how and when SR is to be administered should result in greater behavior change. (p. 69)

Bellack compared the effectiveness of two conditions of self-monitoring in a weight reduction program. The first condition consisted of self-monitoring without explicit instructions about self-reinforcement, and the second consisted of self-monitoring with explicit instructions in the use of self-reinforcement. He considered those two conditions as being equivalent to self-monitoring accompanied by intermittent covert self-reinforcement and self-monitoring accompanied by fairly continuous overt and covert self-reinforcement respectively. The results showed that self-monitoring with explicit instructions in the use of self-reinforcement produced significantly more weight loss than self-monitoring without such instructions. Bellack's finding does not fit with that of Richards et al. where instructions to self-reinforce did not increase the effectiveness of self-monitoring; the former is a blow to Kanfer's model just as the latter is support for Kanfer's conceptualization.

Finally, the covert processes of self-evaluation (that may result in self-consequation) received suggestive support from Wade's (1974) laboratory analogue task. According to Kanfer's interpretation, self-evaluation involves a comparison of performance level with some social or personal standard. In Wade's study, personal standards were represented by motivational self-ratings which were repeatedly obtained from subjects (i.e., they were required to rate their motivation to perform

on a 10-point scale). Thus, the expected correspondence between covert standards and performance levels as well as their relative variations over time could be examined. The results showed a high degree of correlation between motivational self-ratings and rates of (correct) responding in the match-to-sample laboratory analogue task throughout the experiment. Wade (1974) interpreted this finding as reflecting the interrelationships of the covert processes of self-evaluation and self-reinforcement and overt performance.

It has already been noted that an examination of self-monitoring in the overall context of the self-regulation process might help to postulate parameters or variables which may enhance the effectiveness of self-monitoring. Kanfer's model suggests that the goal or standard against which the subject compares his behavior would be a variable of major importance in the self-regulation process. To use an analogy, the standard would play the role of the physical characteristics of the key in an operant chamber. For instance, a key is of a certain size, so responses off its edges do not result in reinforcement; or a key requires a certain force to move it, so lighter perks do not cause it to move. Similarly, the standard (or definition of criterion response) one has if monitoring the behavior of another or the behavior of oneself would determine what responses meet with reinforcement and/or punishment.

Support for the central role of goal- or criterion- setting in the self-regulation process was found by Spates and Kanfer (1977). Using a simple learning task (adding arithmetic problems) with first grade children, they investigated the relative contribution of self-monitoring,

criterion-setting, self-evaluation, and self-reinforcement components in the Kanfer's model. The subjects were pretested and trained in one or a combination of components of the model. The dependent variable was number of errors on pre- and posttesting. Subjects showed a differential improvement as a function of the components on which they were trained. Criterion-setting appeared to be the most critical component. Subjects who received training in this component significantly improved, and those who did not receive training in this component did not. Subjects who received training in criterion-setting and additional components did not show further significant reductions in errors either. It is important to note that this study investigated the effects of prior training in components of the self-regulation model, not the effects of the actual use of the self-regulation techniques. Another study (Hartig & Kanfer, 1973) examined the effects of training and use of the techniques and found the latter to be a critical variable.

If self-monitoring triggers the whole self-regulation process (as hypothesized by Kanfer) and if goal-setting is crucial for this process (as suggested by Spates and Kanfer), it follows that the goal or standard against which the input is compared might contribute to enhance the effects of self-monitoring. Here the implication is that different levels of goal might lead to different effects of self-monitoring, or differential goal-setting might enhance performance differently in self-monitoring situations. The study of the relative effectiveness of self-monitoring as a function of different levels of goal or performance standard then appears as both a critical and significant problem.

A few studies have investigated the influence of goal-setting on self-monitoring and behavior change but the results of these studies are not consistent. Kolb, Winter, and Berlew (1968) studied the influence of self-monitoring combined with individual goal-setting. They required subjects (graduate students) to set personal goals for modifying their own behavior. Each subject monitored behaviors relevant to that goal and kept daily charts. For 10 weeks a series of weekly group meetings was held for the 54 subjects involved in the study. Half of the subjects were encouraged to discuss their progress in each meeting, and group members were encouraged to give one another feedback. The other half of the subjects also met in group meetings but did not discuss their individual project. The results indicated more change for subjects who were provided with feedback (social reinforcement) on their self-reported progress. However, without a self-monitoring alone (without goal-setting instructions) comparison group, it is not possible to assess the effect of the goal-setting instructions.

Mahoney, Moura, and Wade (1973) investigated the relative effectiveness of self-monitoring, self-reward, and self-punishment techniques for weight control. Subjects in the self-monitoring group were required to monitor their daily weight and eating habits and were given weight loss and eating habit improvement goals. Subjects in the self-reward and/or self-punishment groups, in addition to receiving self-monitoring and goal-setting instructions, were requested to reward and/or punish themselves for changes in their weight and eating habits. Subjects in

the control group were provided only with information on stimulus control techniques for weight loss. There was no group employing self-monitoring without goal-setting. The results showed that the groups instructed to self-reward (in addition to self-monitoring and having a goal set) differed significantly from the other groups in weight loss. The self-monitoring (plus goal-setting) condition failed to produce substantial weight loss. With these results one cannot reach any conclusion about the effect of the goal-setting instructions.

In a subsequent study, Mahoney (1974a) investigated whether self-reward enhances the effects of self-monitoring and goal-setting in weight control, and whether self-rewards are more effective when applied to changes in eating habits rather than changes in body weight. Subjects were assigned to one of four conditions: self-reward for weight loss, self-reward for habit improvement, self-monitoring, and delayed treatment control. Except for the delayed treatment group, all subjects were instructed to monitor their daily weight and eating habits during a 2-week baseline period. Following baseline, subjects in the self-monitoring group were required to continue their self-monitoring for the 6-week treatment phase and were given weight loss and eating habit improvement goals. Subjects in the two self-reward groups were instructed to continue their self-monitoring, received weight loss and eating habit improvement goals, and were requested to reward themselves for either attainment of their weekly weight loss goal or attainment of their weekly eating habit improvement goal (depending on the group). Delayed treatment subjects received no treatment during those 8 weeks. All three experi-

mental groups lost weight significantly as compared to the delayed treatment group during the baseline period with no differences between them. The addition of goal-setting to self-monitoring during the 6-week treatment phase failed to produce significant weight loss as compared to the delayed treatment group. However, the addition of self-reward to self-monitoring and goal-setting did produce significant improvements in weight loss, and these improvements were greater when self-reward was applied to eating habit changes than to weight loss. This study may be interpreted as indicating that goal-setting instructions do not enhance self-monitoring effects but there are other possible interpretations. For instance, it is possible that a goal overlaid on self-monitoring instructions negates (or reduces) the effects of self-monitoring instructions alone. A self-monitoring alone comparison group would be useful in checking out this possibility. Another possibility is that self-monitoring effects decrease over time and, after 2 weeks of self-monitoring, they are no longer producing significant weight loss. A goal overlaid on this has no effect but self-reinforcement does, so the self-monitoring plus goal plus self-reward groups show changes compared to the no-treatment control group but the self-monitoring plus goal group does not. The inclusion of a group where the goal was set at the beginning of self-monitoring (i.e., at the beginning of baseline in this study) would be useful in assessing this second possibility.

In a study designed to analyse the relative efficacy of the different components generally incorporated in the treatment packages used in behavior modification programs for the treatment of obesity, Romanczyk

et al. (1973) compared the following groups: (1) no-treatment control, (2) self-monitoring of weight (without goal-setting), (3) self-monitoring of weight and caloric intake (without goal-setting), (4) self-monitoring of weight and caloric intake (with caloric intake goal) plus symbolic aversion, (5) the last condition plus relaxation, (6) the last condition plus behavioral management and stimulus control instructions, and (7) the last condition plus contingency contracting. While self-monitoring of weight (Group 2) was no more effective than the no-treatment control condition (Group 1), self-monitoring of weight and caloric intake (Group 3) was as effective as any of the other conditions (Group 4, 5, 6, 7) in producing weight loss. Unfortunately, the self-monitoring plus goal group necessary to give a clear indication of the effects of goal-setting was not included. Therefore, no conclusion can be reached from this study about the effects of goal-setting combined with self-monitoring.

Finally, Kazdin (1974b) examined the effect of providing a goal versus no goal on monitoring and compared three conditions of monitoring in a sentence-construction task. Subjects who were provided with a goal were told that a total of 35 out of 40 I and we statements was the cutoff for a good performance, whereas subjects in the no-goal condition were given no criterion for a good performance. The three conditions of monitoring involved self-monitoring, other-monitoring, and no monitoring. Self-monitoring subjects were asked to count (on a digital counter) the number of sentences they used beginning with I or we pronouns. Other-monitoring subjects were told that the experimenter would count the number of sentences beginning with I or we pronouns on the counter.

No-monitoring subjects were not given a counter nor were they told that their behavior was monitored. The results indicated that goal and monitoring affected behavior. Subjects who were provided with a goal used the target pronouns significantly more frequently than subjects who were not given a goal. The goal influenced both self-monitoring and other-monitoring subjects but did not influence no-monitoring subjects. Finally, whether or not a goal was given, the self- and other- monitoring groups responded with significantly more target pronouns than did the no-monitoring group but they did not differ from each other. So, from this study, it is possible to conclude that providing a goal augments the effects of self-monitoring.

To sum up the studies reviewed above, it is evident that the effect of goal-setting instructions on self-monitoring has not yet been thoroughly investigated. Only Kazdin's (1974b) study was a direct test, and it provided support for a positive effect of goal-setting instructions on the behavior change influence of self-monitoring. None of the other studies (Kolb et al., 1968; Mahoney, 1974a; Mahoney, Moura, & Wade, 1973; Romanczyk et al., 1973) constituted an adequate test of the effect of goal-setting on self-monitoring. Additional research is certainly needed to provide a legitimate test of the hypothesis that goal-setting enhances self-monitoring effects on behavior.

None of the studies reviewed above has dealt with the effects of self-monitoring as a function of differential goal-setting. Subjects have usually been provided with standardized goals. In weight reduction studies involving self-monitoring, for instance, subjects have

characteristically been given a weekly 1 to 2 pound weight loss goal (e.g., Mahoney, 1974a; Mahoney, Moura, & Wade, 1973) or a daily 1200 to 1500 calories intake goal (e.g., Romanczyk et al., 1973). As indicated earlier, when discussing Kanfer's model, differential goal-setting instructions might lead to differential effects of self-monitoring on behavior. Thinking in terms of the key in an operant chamber, the issue of differential goal-setting could be considered as follows. The key, by its physical properties (e.g., size, force required to operate it, etc.), defines the goal level (i.e., the behavior that meets criterion level and results in reinforcement). If key force is set high (high goal level), few behaviors will result in reinforcement and it might be that reinforcement is too thin to establish and maintain the behavior. On the other hand, if the key is set so very little force is required to operate it (low goal level), many reinforcers will be delivered. Initially this should lead to a rapid acquisition of the behavior but in the long run there is a potential for satiation with subsequent loss of control over the behavior. This argument leads one to expect some optimal key force at intermediate values (intermediate goal level) for long run changes, although initially one would expect low goal level to be superior. In the self-monitoring context, however, this is all complicated further by the possibility that (according to Kanfer's model) the subject might be punishing himself/herself for performance that does not operate the key, i.e., that does not meet the criterion. Another possibility is that the subject might not always self-deliver the same reinforcers and/or punishers for his/her performance, or that the subject might

self-administer reinforcers and/or punishers of a different magnitude. Therefore, predictions regarding the influence of various goal levels on self-monitoring effectiveness become very difficult to make, although the issue definitely deserves to be investigated.

Another aspect to consider when discussing goal-setting refers to the way the goal is set. The distinction to be made here is between an explicit and implicit way of setting goals. An explicit goal refers to a goal that is directly and strongly stated, whereas an implicit goal refers to a goal that is more subtly and indirectly stated. The studies reviewed above have all used explicit goals. The use of implicit goals has never been investigated. It appears, however, that some self-monitoring studies might have involved some sort of implicit goals. This seems to be the case especially in two recent weight reduction studies done by Bellack and his collaborators (Bellack, Rozensky, & Schwartz, 1974; Bellack, Schwartz, & Rozensky, 1974). The purpose of the first study was to compare two forms of self-monitoring (prebehavior and postbehavior monitoring) in a behavioral weight reduction program. The intent of the second study was to examine the role or contribution of external control as an adjunct to self-monitoring in a weight control program identical to that used in the first study. This weight reduction program consisted of three main components: general diet information, stimulus control techniques, and self-monitoring of food intake. With regard to the general diet information component, the authors said that "there was no limitation set on specific foods, food types or caloric intake"; on the other hand, "subjects were provided

with calorie charts, height/weight tables, and tables indicating daily caloric totals for maintenance of weight" (Bellack, Rozensky, & Schwartz, 1974, p. 525). Even if the subjects were requested to monitor their food intake without any specific limitation, the investigators may have indirectly set for them a daily caloric intake goal by providing them with such "daily caloric intake guides". This would qualify as an implicit goal. No definite statement can be made about the effect of such implicit goals based on Bellack et al.'s studies, all self-monitoring subjects having been provided with the same daily caloric intake guides. Nevertheless, these two studies suggest how implicit goals can be set. The potential use of implicit goals in a self-monitoring context certainly deserves to be examined further since different ways (explicit versus implicit) of setting goals might be associated with differential enhancing influence of goal-setting instructions on self-monitoring. A close examination of Kanfer's model, however, does not suggest a difference in effect between self-monitoring combined with an explicit goal and self-monitoring combined with an implicit goal. Indeed, in the second stage of the self-regulation process as conceptualized by Kanfer, the individual would evaluate himself by comparing his performance level to some social or personal standard. On the one hand, comparing one's performance to some social performance criterion might be viewed as using an explicit goal prescribed in some way by some external social agent. On the other hand, when the subject relies on some personal standard to evaluate his

performance, external instructions conveying an implicit goal may serve as a critical cue which determines the specific personal standard subject sets for himself. To the extent that the goal conveyed in such instructions is equivalent to a social explicitly stated goal, then one might expect no difference in effect between self-monitoring combined with an explicit goal and self-monitoring combined with an implicit goal.

There is, in addition, some legitimate practical reason for looking at the issue of implicit versus explicit goal-setting as suggested in the following example. It is possible that the use of an implicit goal enhances self-monitoring effects and it is possible that the client perceives this task as rather simple and effortless. If this turns out to be the case, then there has been a change in the desired direction with very little effort by the client. The therapist is now in an excellent position to use this change to "sell" the next stage in therapy which is designed to produce further desirable changes but probably requires more effort on the part of the client. Such a procedure may

be seen as a loose analogy to response priming (Ayllon & Azrin, 1968; Azrin & Powell, 1969; O'Brien, Azrin, & Henson, 1969). The potential clinical implications suggested by this example illustrate the practical value of studying the extent of effects that might be produced by self-monitoring as a function of implicitly stated goal-setting instructions.

Self-Monitoring and Weight Control

Recently a number of studies, based on behavior therapy approaches, have proved successful in the treatment of obesity (for reviews, see Abramson, 1973, 1977; Bellack, 1975; Brightwell & Sloan, 1977; Hall & Hall, 1974; Leon, 1974, 1976; Stuart, 1975; Stunkard & Mahoney, 1976). It has even been concluded that "behavior modification is more effective than previous methods of treatment for obesity" (Stunkard, 1972, p. 398). Such positive results have been related to a wide range of techniques or procedures.

Irrespective of the techniques or procedures used, the investigators have assumed that obesity, in otherwise healthy individuals (e.g., absence of hormonal or metabolic disorder), is the result of a positive energy balance, i.e., an excess of food intake beyond the demands of energy expenditure. It follows that decreased food intake or increased activity or both can produce weight loss (Bellack, 1975; Hall & Hall, 1974). Most behavioral treatments have focused on decreased food intake and "have emphasized the alteration of everyday eating habits by manipulation of eating-related environmental cues (i.e., stimulus control)" (Mahoney,

Moura, & Wade, 1973, p. 404). Increased activity has received relatively little attention (see Harris & Hallbauer, 1973, for a discussion of this issue).

In studies focusing on intake, the self-monitoring technique has been used either as the only treatment strategy or as part of a comprehensive treatment program for weight control. As one has seen, the evidence for the effectiveness of the self-monitoring component is conflicting (Bellack, 1976; Bellack, Rozensky, & Schwartz, 1974; Bellack, Schwartz, & Rozensky, 1974; Mahoney, 1974a; Mahoney, Moura, & Wade, 1973; Romanczyk, 1974; Romanczyk et al., 1973; Rozensky & Bellack, 1976).

In weight control studies, self-monitoring has been directed at a number of different elements or units. Thus, subjects have been instructed to monitor their weight, i.e., to weigh themselves and keep a daily graph of their weight (Mahoney, 1974a; Mahoney, Moura, & Wade, 1973; Romanczyk, 1974; Romanczyk et al., 1973); or they have been required to monitor their food intake, i.e., to record everything they ate, including the amount, time, and place of eating, and these records had to be made either immediately after eating (Bellack, Rozensky, & Schwartz, 1974) or just prior to eating (this being equivalent to monitoring of intended eating) (Bellack, 1976; Bellack, Rozensky, & Schwartz, 1974; Bellack, Schwartz, & Rozensky, 1974; Rozensky & Bellack, 1976); or they have been requested to monitor their caloric intake, i.e., to keep a running cumulative total of daily caloric intake of all foods and beverages ingested (Romanczyk, 1974; Romanczyk et al., 1973); or they have been asked to monitor their eating habits, which consisted in either recording food quality, food

quantity, and situational determinants as in posteating monitoring of food intake (Mahoney, 1974a) or recording the daily frequency of "fat thoughts" (discouraging self-verbalizations), "thin thoughts" (encouraging self-verbalizations), instances of indulgence (eating a fattening food or excessive quantity), and instances of restraint (refusing a fattening food or reducing food intake) (Mahoney, Moura, & Wade, 1973).

Restraint monitoring has not been used in weight control studies except as part of eating habit monitoring, which entailed the recording of a combination of elements or units (Mahoney, Moura, & Wade, 1973). Restraint monitoring may be defined as the recording of an instance where the subject judges that he/she resisted eating something that he/she wanted to eat (e.g., one has the urge to eat a donut as one watches TV but just as one goes to pick it up, one decides not to and does not eat it) or the recording of an instance where the subject judges that he/she ate less than he/she normally would have (e.g., one is finishing one's plate of food and is asked by the hostess if one would like another helping; usually one does take two but this time one declines and eats no more). It is rather surprising that researchers did not pay more attention to restraint as a unit of monitoring, given the importance it may have in relation to the act of eating. A closer look at Kanfer's model and some of its implications may make the importance of focusing on restraint monitoring clear.

According to Kanfer, self-monitoring never occurs alone: once the subject self-monitors, he also carries through the other components of the self-regulation process ending with self-consequation. This model suggests that the most direct efficient arrangement for changing behavior

would be to monitor the target behavior (i.e., the behavior one wishes to change) right after it occurs as this will automatically lead to self-evaluation and self-delivery of consequences. Since the consequences are immediately contingent on the target behavior, then one would expect them to effect the occurrence of the target behavior. Less efficient arrangements would be to monitor some product of the target behavior either immediately after its occurrence or some time later, or to monitor the target behavior some time after it occurs. Since the consequences are not immediately contingent on the target behavior, then one would expect them to have less effect on the target behavior.

In a weight reduction situation, the behavior one wishes to change is eating, and this may be understood in two ways: either decreasing eating or increasing noneating (i.e., restraining). One arrangement for changing eating would be to monitor a product of the target behavior to be recorded some time after it occurs. A monitoring unit such as weight at the end of the day would fall in this first category. Another arrangement would be to monitor a product of the target behavior to be recorded right after its occurrence. In this second category would be monitoring what is eaten (e.g., posteating monitoring of food intake, posteating monitoring of eating habits defined in terms of food quality, food quantity, and situational determinants) and caloric intake (e.g., posteating monitoring of caloric intake). A third arrangement would be to monitor and record the target behavior some time after its occurrence. Monitoring of instances of indulgence and/or restraint some time after they occur would fall in this third category. A fourth arrangement would

be to monitor and record the target behavior immediately after it occurs. Again, instances of indulgence and/or restraint monitored and recorded right after their occurrence would fall in this fourth category. On the basis of the argument derived from Kanfer, it appears that the fourth category would represent the most efficient arrangement for changing eating behavior, whereas the third, second, and first categories would represent less efficient arrangement with the latter corresponding to the least efficient arrangement.

The above analysis, in addition to supporting the legitimacy and appropriateness of restraint as a monitoring unit, reveals that care must be taken in selecting a particular unit to be monitored in relation to the presenting problem (in the present case, weight problem). Actually, recent weight control studies have suggested the unit of self-monitoring to be a critical variable. Thus, weight monitoring (Romanczyk, 1974; Romanczyk et al., 1973) and weight plus eating habit monitoring (Mahoney, 1974a; Mahoney, Moura, & Wade, 1973) did not produce significant weight loss. More positive results have been obtained with self-monitoring of weight plus caloric intake (Romanczyk, 1974; Romanczyk et al., 1973). The failure with weight monitoring and weight plus eating habit monitoring and the success with weight plus caloric intake monitoring have been attributed to the more specific and functional relationship of caloric intake monitoring to the act of overeating than daily weighing (Romanczyk et al., 1973).

With respect to food intake monitoring, Bellack, Rozensky, & Schwartz (1974) showed that preeating monitoring of food intake (or intended eating)

produced greater weight loss than posteating monitoring of food intake, which was not found to be better than a waiting list control condition. The authors, considering eating behavior as the end point of an S-R chain, argued that preeating monitoring of food intake would have the effect of breaking the chain (or introducing new discriminative stimuli which direct the behavior of eating along another chain), whereas post-eating monitoring of food intake would not. In another study (Rozensky & Bellack, 1976) preeating monitoring of food intake has been found to be as effective for producing weight loss as a financial contingency procedure. Preeating monitoring of food intake has also been found to be more effective when combined with continuous contact (either personal contact or mail contact) with experimenter-therapist than when combined with no such contact (Bellack, Schwartz, & Rosensky, 1974). This pattern of results, however, has not been replicated in a subsequent study which used preeating monitoring of food intake and showed no difference in weight loss between mail contact subjects and no-ongoing contact subjects (Bellack, 1976). With regard to the latter aspect, it is important to add that Romanczyk's (1973; 1974) results obtained with caloric intake monitoring did not incorporate ongoing contact with the experimenter-therapist.

All these studies indicate the critical importance of the monitoring unit in relation to self-monitoring efficacy for weight reduction. In this context, the proper weight loss effects associated with restraint as a unit of monitoring certainly deserve to be more thoroughly investigated, since restraint monitoring reveals itself as a particularly appropriate

arrangement for changing eating behavior and, accordingly, generating weight loss.

In summary, the focus of the present research was to be put on four main issues. The first issue referred to the contribution of goal-setting instructions to the effectiveness of self-monitoring applied to weight control. As previously discussed, the effects of goal-setting instructions on self-monitoring have not yet been thoroughly examined. Actually, after Kazdin's (1974b) study, this was going to be the second only legitimate test of the effects of goal-setting instructions on self-monitoring behavior change influence. On the basis of Kanfer's self-regulation model as well as the demonstration of the central role of goal-setting in the self-regulation process, it was hypothesized that goal-setting instructions, by providing a specific criterion against which performance level could be examined, would activate self-evaluative influences and, therefore, would enhance the effects of self-monitoring.

The second issue was the relative efficacy of self-monitoring for weight reduction as a function of differential goal-setting instructions. As suggested by Kanfer's model, different levels of goal might lead to different effects of self-monitoring. For the reasons given earlier, however, no specific hypotheses regarding the influence of various goal levels on self-monitoring effectiveness were formulated.

The third issue referred to the use of explicit versus implicit goal-setting instructions in combination with self-monitoring. The reason for looking at this issue was two-fold: first, to see whether explicit and implicit goal-setting instructions enhanced differentially self-

monitoring effectiveness; and second, to examine the potential clinical implications associated with implicit goal-setting instructions. Depending upon the extent of its effects, self-monitoring combined with implicit goal-setting instructions might serve to facilitate the implementation of comprehensive treatment strategies in a clinical context. No specific hypotheses were formulated with regard to the use of explicit versus implicit goal-setting instructions in combination with self-monitoring.

The fourth and last issue was to assess the relative effectiveness of restraint monitoring instructions for weight reduction. An appropriate way of examining the proper effects associated with restraint as a unit of monitoring was to compare it with another unit of monitoring which has already been shown effective in producing weight loss. This was the case with caloric intake monitoring which, in addition to having been found effective in generating weight loss (in the absence of therapist contact), has also been found as effective as various combinations of behavior management and stimulus control techniques. Again, no specific hypotheses were formulated in terms of weight loss with regard to the use of restraint and caloric intake as units of monitoring.

It should be pointed out that with the exception of the first issue (goal-setting), all other issues were investigated from an entirely empirical approach. Each issue had its origin in an examination of Kanfer's self-regulation model. However, Kanfer's model was primarily used as a guide suggesting critical investigation targets and, except for the

goal-setting issue, the present project was in no way intended as a test of that model. In this sense, the present investigation can be conceptualized as standing midway between a traditional hypothesis testing-oriented type of research and an operant mode of empirical inquiry.

A series of three experiments were carried out to investigate aspects of the four issues just described. Each experiment will now be reported separately. Then, the overall implications of the combined results will be discussed.

CHAPTER II

PILOT EXPERIMENT

In the introduction a number of issues were raised, three of which determined the foci of the pilot experiment. One issue discussed referred to the importance of the monitoring unit in relation to self-monitoring efficacy. To date restraint monitoring had not been used in weight reduction studies. The pilot experiment then set out to compare the effectiveness of monitoring instances of restraint with that of the well established technique of monitoring caloric intake. A second issue discussed was the fact that there had been only one fair test of the contribution of goal-setting instructions to self-monitoring effects. It was decided therefore to compare within the self-monitoring of restraints a group that was given a goal with a group that was given no goal. A third issue discussed in the introduction was that of the possibility of setting implicit goals. Thus the pilot experiment included a group where an attempt was made to convey an implicit goal to the subjects. In addition to providing a preliminary view of the fruitfulness of monitoring restraints, of setting goals in a self-monitoring situation, and of setting implicit as compared to explicit goals, the pilot experiment had a fourth purpose, that of identifying administrative procedures that would make subsequent experiments more efficient.

The pilot experiment involved four experimental groups: a caloric intake monitoring-explicit goal group, a restraint monitoring-no goal group, a restraint monitoring-explicit goal group, and a restraint monitoring-implicit goal group.

In the caloric intake monitoring group the goal chosen was the one commonly used in studies incorporating some limitation on caloric intake, i.e., 1200 calories per day for women and 1500 calories per day for men (e.g., Romanczyk et al., 1973; Wollersheim, 1970). Such figures are based on the estimated usual intake of most normal women and men, this intake being 2000 to 2800 calories per day - although intakes of less than 2000 calories and just over 2000 calories would meet the needs of most women and men respectively (Bray, 1972). Given that usual intake, limitation on caloric intake has to be sufficient to produce a negative caloric balance of 500 to 1000 calories per day. Such a level provides a steady weight loss of 1 to 2 pounds per week, which is itself considered as a moderate goal (Hall & Hall, 1974).

In the relevant restraint monitoring groups the goal chosen was eight restraints per day. This figure was based on the estimated usual occasions of eating per day and represented an average of two restraints per meal (breakfast, lunch, dinner) plus two additional restraints during the day (e.g., at evening snacking).

Finally, it was predicted that self-monitoring combined with a goal would produce a greater weight loss than self-monitoring combined with no goal. However, no specific predictions were made about the relative effectiveness of restraint monitoring versus caloric intake monitoring or about the relative effectiveness of the use of explicit versus

implicit goals.

Method

Subjects

An advertisement was placed in the student newspaper and at the information service of the university centre of the University of Ottawa. The advertisement invited males and females to participate in a research project concerning weight control (see Appendix A). The advertisement indicated that to be eligible participants had to meet the following criteria: (a) a minimum age of 18 years and a maximum of 45 years, (b) a minimum of 10 percent overweight, (c) nonpregnant status, (d) no surgery in the preceding 2 months, and (e) not now or in the past under a physician's care for a weight related disorder (e.g., hormonal or metabolic disorder). Two additional conditions for participating in the program were (a) no involvement in any other weight reduction program nor taking medication for weight loss (e.g., diet pills), and (b) a monetary deposit of \$15.00 refundable upon completion of the program and not contingent upon weight loss (the refund was returned even if the program was not completed).

Of the 57 people who answered the advertisement, 51 met the criteria for inclusion in the experiment (45 females, 6 males). Seventy-four percent of the subjects were students and the remainder were nonstudents (e.g., civil servants, secretaries, professors, etc.). Ages ranged from 18 to 45 years with a mean of 23.7 years.

Experimenter and Assistants

The author served as experimenter and four female students (three graduates, one undergraduate) served as assistants. Neither the experimenter nor the assistants had previous experience dealing with overweight people.

It was the responsibility of the experimenter to contact subjects, to meet with them individually, to run group meetings, to give questionnaires, to collect self-monitoring cards, and to take measurements on male subjects. The main role of the assistants was to take measurements on female subjects.

Procedure

Contact between experimenter (and assistants) and subjects can be summarized as follows: initial phone interview, individual screening meeting, first group meeting (orientation meeting), three individual weekly meetings, and final group meeting. The differential treatment was applied during the first group meeting (orientation meeting); all other meetings were nondifferential for the four experimental groups.

As instructed in the advertisement potential subjects first called the experimenter. Over the telephone he gave them general information about the program, told them about the two additional conditions for participating in the program, ensured that basic requirements were met, and assigned each applicant a time a few days later to report at his

office for a short individual screening meeting.

The main purpose of the 15 to 20 minute individual screening meeting was to take weight and height measurements in order to determine the subjects' percentage overweight. Weight to the nearest quarter of a pound was obtained on a Detecto medical balance scale¹. Subjects were weighed without shoes in hospital disposable gowns in a washroom close to the experimenter's office. Height was measured to the nearest inch without shoes. Weight and height measurements were taken by one assistant or the experimenter depending on the sex of the subject. Percentage overweight was determined by using the 1969 Metropolitan Life Insurance Company norms. The norms provided, separately for males and females, a range of weights for each of three frame sizes (small, medium, large) and for different heights. Frame size was determined by visual inspection of each subject and the midpoint of each range was selected as the criterion. Subjects who were at least 10 percent overweight and met all other conditions were included as subjects in the study.

The individual screening meeting served also to obtain information concerning the subject's free times, to collect the deposit, and to have the subject fill out a prequestionnaire adapted from Levitz and Jordan (1975) inquiring about the history of his/her weight problems (see Appendix B). Finally the subject was required to sign a statement saying that he/she was participating in the program on a voluntary basis and accepted responsibility for his/her involvement (see Appendix C). At

¹ As the vast majority of studies on weight control use pounds as units of measurement and as the metric system had not been formally adopted in Canada when the project was initiated, all weight measurements in all three studies were made in pounds.

the end of the meeting the subject was told that within 1 week he/she would be contacted by telephone and given the time and place of the

first group meeting (the orientation meeting).

Following the individual screening meetings the 51 subjects selected were randomly assigned to one of the four experimental groups. Each group was composed of 13 subjects with the exception of the restraint monitoring-implicit goal group which was composed of 12 subjects. One week after the individual screening meetings each subject was contacted and invited to an appropriate experimental group orientation meeting. Separate orientation meetings were conducted by the experimenter for each experimental group, during which the procedures were described from a prepared script. At each orientation meeting the experimenter was accompanied by one assistant. The experimental procedures will now be described for each experimental condition.

Caloric Intake Monitoring-Explicit Goal Group (CIMEG). The reader is referred to Appendix D for full script. A brief outline will be given here. After having been reminded of the experimental nature of the program subjects were presented with factual information pertaining to causes of being overweight. An emphasis was put on viewing weight problems as representing an imbalance between caloric intake and energy expenditure. Factual information pertaining to nutrition was also given although no special or preset diet was prescribed.

Then subjects were presented with a rationale for the details of the so-called preliminary stage of the weight control program. On the basis of this rationale they were first required to self-monitor the caloric intake of all foods and beverages ingested each day (the monitoring was to be done immediately after each occasion of eating or drinking

during the day). A calorie-counting booklet and self-monitoring cards (one for each day) were given to each subject, and there were instructions in how to use them. Following these instructions information concerning a reasonable level of intake to aim for was given and a daily caloric intake goal was explicitly set. Females were required to restrict their caloric intake to 1200 calories per day during the 4-week preliminary stage, whereas males were asked to restrict theirs to 1500 calories per day.

At the end of the orientation meeting subjects were presented with a list of available times for meeting individually with the experimenter during the following weeks (each subject chose one of the available times). Subjects were then weighed. Finally they were told that when the preliminary stage was over another group meeting would be set and the second phase of the program would be introduced.

In addition to monitoring their daily caloric intake subjects were required to come in at the end of each week for the next 3 weeks for a short individual meeting (10 to 15 minutes). During each of these meetings weight measurements were taken according to the procedure already used at the individual screening meeting and the first group meeting, and self-monitoring cards for the preceding week were collected.

At the end of the fourth week following the orientation meeting subjects were seen again as a group. They were weighed and their self-monitoring cards (for the fourth week) were collected. They were also asked to fill out a postquestionnaire inquiring about how they dealt with the preliminary stage (see Appendix E). Then the content of the

second phase of the program was described.

The focus of the present research was on the first phase of the program, i.e., the self-monitoring phase. The second phase was included as a service to the subjects. No data was collected from the second phase (see Appendix F for a detailed account of the content of the second phase).

Restraint Monitoring-No Goal Group (RMNG). The procedure for this group (see Appendix G for the full script) was essentially the same as for the CIMEG group except that after subjects had been presented with a rationale for the details of the preliminary stage of the weight control program, they were required to self-monitor, each day, the number of times they restrained their food intake (the monitoring was to be done immediately after each restraint). Then self-monitoring cards (one for each day) were given to each subject as well as instructions on how to use them. Particular attention was paid to clearly specifying what was meant by a restraint and examples of instances of restraint were provided. Subjects were instructed to record a restraint whenever they felt an urge to eat and did not eat and/or whenever they consciously reduced their food intake (e.g., by putting less food on the plate or eating less of the food on the plate).

After self-monitoring instructions had been completed no information concerning reasonable levels of restraint to exercise was given and no daily restraint goal was set either explicitly or implicitly. The remaining part of the procedure (including the second phase of the

program) was the same as for the CIMEG group.

Restraint Monitoring-Explicit Goal Group (RMEG). The procedure for this group was exactly the same as for the RMNG group except that after self-monitoring instructions had been completed, information pertaining to reasonable levels of restraint to exercise was given and a daily restraint goal was explicitly set. Subjects were required to exercise eight restraints per day during the 4-week preliminary stage (see Appendix G for the full script).

Restraint Monitoring-Implicit Goal Group (RMIG). The procedure for this group was identical to that of the RMEG group except that the daily restraint goal was implicitly set. Following the self-monitoring instructions subjects were told that eight restraints per day was an effective number in bringing about weight loss but that one would worry about that after the preliminary stage was over when one would get into the second phase of the program (see Appendix G for the full script).

Results

Only subjects who completed the 4 weeks of self-monitoring were included in the data analysis. Of the 51 subjects originally selected, one (a female) decided not to participate further after the orientation meeting and two (one male, one female) dropped out in the course of the program. These three subjects were in the RMIG group. The final sample consisted of 13, 13, 13, and 9 subjects in the CIMEG, RMNG, RMEG, and RMIG groups respectively.

Each subject's weights at Weeks 1, 2, 3, and 4 were converted to a percentage of the pretreatment weight. The reason for choosing percentage body weight (as opposed to either raw weight or percentage overweight) as the dependent variable was that it took initial weight into consideration and could be determined reliably (Bellack and Rozensky, 1975). In addition, from a statistical point of view, it had the effect of insuring the homogeneity of variance within groups.

The statistical analyses conducted included a two-way analysis of variance with repeated measures followed by a simple main effect analysis and a trend analysis. Both the two-way analysis of variance with repeated measures and the trend analysis were made using the BMDP2V computer program which took care of the unequal n's in the various treatment groups. A series of additional analyses using χ^2 test or t test were performed for assessing potential differences in either goal-attainment, or weight loss as a function of goal-attainment, or reported adoption of the prescribed goal. Finally, efforts were made to find some approximative equivalence between caloric intake and restraint monitoring by looking at the reported daily average number of restraints and the amount of weight loss. All statistical analyses were conducted on the converted scores. Table 1 contains the average percentage body weight at each measurement point (including pretreatment measurement taken at the orientation meeting) for each experimental group.

Table 1
Average Percentage Body Weight at Each
Measurement Point for All Groups

Group	<u>n</u>	Pretreatment	End of Week 1	End of Week 2	End of Week 3	End of Week 4
CIMEG	13	100	98.53	98.13	97.80	97.65
RMNG	13	100	98.83	98.18	98.72	99.68
RMEG	13	100	98.59	98.60	98.55	98.00
RMIG	9	100	98.35	98.45	98.12	97.56

Percentage body weight scores were analysed by a two-way analysis of variance (monitoring groups x time) with repeated measures on one factor (time). The time factor represented the weekly measurements. This analysis, as reported in Table 2, revealed no significant main effect for monitoring groups or for time but a significant monitoring groups x time interaction, $F(9,132) = 2.79$, $p < .01$.

Table 2
Summary of Two-way Analysis of Variance

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Monitoring groups (A)	3	6.90	0.58
Subjects within groups	44	11.82	
Time (B)	3	1.06	1.04
A X B	9	2.85	2.79*
B X Subjects within groups	132	1.01	

* $p < .01$

An analysis of the simple main effects used to isolate the sources of the interaction first showed that the monitoring groups did not differ at the end of Week 1, Week 2, or Week 3, but that they did differ at the end of Week 4, $F(3,176) = 3.26$, $p < .05$. When the interaction was analysed according to between-group changes, the RMNG group was found to be significantly different from the other three groups which did not differ among themselves, $F(3,132) = 4.95$, $p < .01$. So all the self-monitoring groups which included a goal produced significantly more weight loss at the end of Week 4 than the group that was given no goal. Figure 1 presents mean percentage body weight from pretreatment to Week 4 for the four experimental groups.

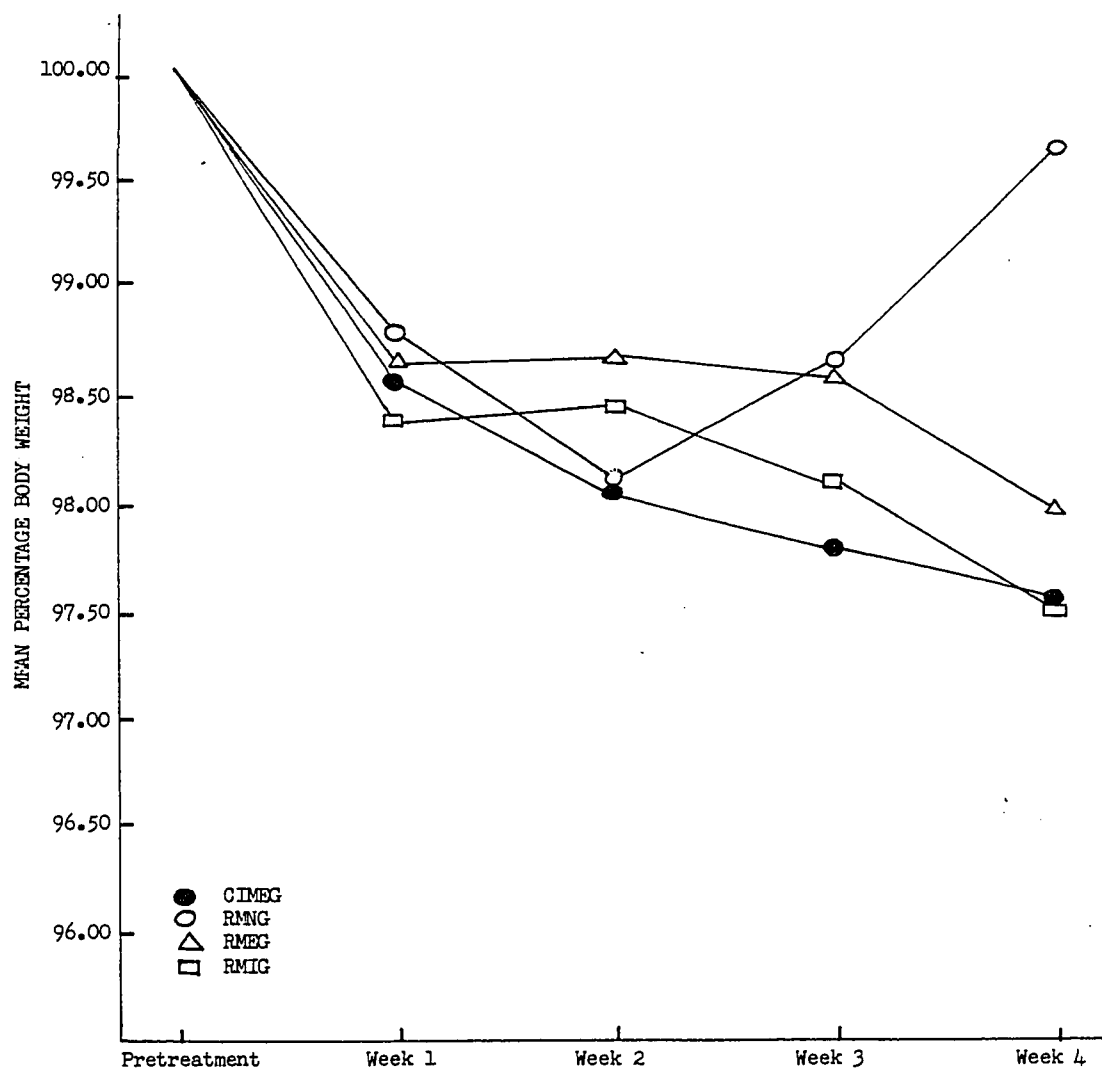


Figure 1. Mean Percentage Body Weight from Pretreatment to Week 4 Across Experimental Groups.

A trend analysis of the monitoring groups x time interaction was also carried out. This analysis, reported in Table 3, showed that the interaction was due to significant differences in linear trend components, $F(3,44) = 2.98$, $p < .05$; and quadratic trend components, $F(3,44) = 4.11$, $p < .05$ (i.e., the particular linear and quadratic functions for time factor were not the same for the different monitoring groups). In terms of percentages, the linear component accounted for 59.48 percent ($5.085 / 8.550 \times 100$) of the interaction, whereas the quadratic component accounted for 38.98 percent ($3.333 / 8.550 \times 100$). In addition a trend analysis of the simple main effects showed that the linear trend with the CIMEG group was significant by itself, $F(1,132) = 5.60$, $p < .05$; that the linear trend with the RMNG group was significant by itself, $F(1,132) = 6.20$, $p < .05$; and that the quadratic trend with the RMNG group was significant by itself, $F(1,132) = 8.24$, $p < .01$. However, the quadratic trend with the CIMEG group, the linear and quadratic trends with the RMEG group, and the linear and quadratic trends with the RMIG group were not found to be significant by themselves. The latter analysis indicated that the RMNG group (the only group associated with a significant quadratic trend) first generated a weight loss (linear trend) followed by a weight gain (quadratic trend). In the other three groups, however, initial weight loss was not accompanied by such weight gain. Moreover, of these other three groups, the CIMEG group was the one which most clearly produced a constant (linear trend) weight loss over the self-monitoring period.

Table 3
Summary of Trend Analysis

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Monitoring groups (A)	3	6.90	0.58
Subjects within groups	44	11.82	
Time (B)	3	1.06	1.04
Linear trend	1	2.77	1.63
Quadratic trend	1	0.29	0.36
Cubic trend	1	0.12	0.23
A X B	9	2.85	2.79**
Linear trend	3	5.08	2.98*
Quadratic trend	3	3.33	4.11*
Cubic trend	3	0.13	0.24
B X Subjects within groups	132	1.01	
B X Subjects within groups (linear)	44	1.70	
B X Subjects within groups (quadratic)	44	0.81	
B X Subjects within groups (cubic)	44	0.54	

* $p < .05$

** $p < .01$

An additional analysis was performed to compare the number of subjects who attained the daily caloric intake or restraint prescribed goal in the relevant groups. Goal-attainment was assessed from the self-monitoring cards subjects brought back each week. By adding the daily number of calories or restraints reported on these cards and dividing by the number of self-monitoring cards, the daily average calories or restraints were computed for each subject. Subjects whose daily average calories or restraints were equal to or greater than the prescribed goal were considered as having attained the goal. Subjects whose daily average calories or restraints were below the prescribed goal were considered as not having attained the goal. Subjects who had brought back less than 21 self-monitoring cards were excluded. This computation revealed that subjects attained the daily prescribed goal in a proportion of 25.0 percent, 7.6 percent, and 0.0 percent in the CIMEG, RMEG, and RMIG groups respectively. χ^2 test (corrected for continuity) was used comparing subjects who attained the goal and subjects who did not from one group to the other. The results showed no significant differences in goal-attainment between the CIMEG and RMEG groups, between the CIMEG and RMIG groups, and between the RMEG and RMIG groups.

An analysis was conducted with the purpose of shedding more light on the role of goal-setting instructions in relation to self-monitoring effectiveness. For each relevant group as well as for the relevant groups combined, comparisons were established between the average percentage body weight at the end of Week 4 of subjects who attained their

daily prescribed goal (either caloric intake or restraint goal) and the average percentage body weight of subjects who did not. The RMIG group was not included in some comparisons because no subject in this group attained the daily prescribed goal. The RMNG group, in which subjects were not assigned any goal, was not included in any of the comparisons. For each relevant group, a t test for unrelated samples was performed comparing those who attained their goal with those who did not. The results indicated no significant differences in weight loss between subjects who achieved their goal and subjects who did not in either the CIMEG group or the RMEG group. However, when these two groups plus the RMIG group were pooled together, a significant difference in percentage body weight at the end of Week 4 was found between subjects who did attain their goal and those who did not, $t(32) = 2.07$, $p < .05$. This indicated a greater weight loss for the formers than the latters.

Comparisons were also established between the average percentage body weight at the end of Week 3 of subjects who achieved their daily prescribed goal and the average percentage body weight of subjects who did not. Again, for each comparison, a t test for unrelated samples was used. The results showed no significant differences in weight loss between those who attained their goal and those who did not in the CIMEG group. In the RMEG and RMIG groups no subject attained the daily prescribed goal. Finally, when the CIMEG, RMEG, and RMIG groups were pooled together, no significant differences in percentage body weight at the end of Week 3 were found between subjects who did achieve their goal and those who did not.

An analysis was carried out aiming at exploring the issue of explicit versus implicit goal-setting. One aspect directly relevant to this issue was the reported adoption of the explicitly or implicitly prescribed goal. Even if the main analyses reported above did not reveal any significant difference in terms of weight loss between the group which was assigned an implicit goal (the RMIG group) and those which were assigned explicit goals (the CIMEG and RMEG groups), the percentage of subjects who reported having adopted the prescribed goal differed from one group to the other. This information was contained in the answer to the seventh question of the postquestionnaire that subjects completed at the end of the 4-week self-monitoring period (see Appendix E). Computation of the answers given to this question revealed that no subject in the RMNG group reported having set a goal for himself/herself. With regard to the other three groups, subjects reported having adopted the explicitly or implicitly prescribed goal in a proportion of 84 percent, 54 percent, and 11 percent in the CIMEG, RMEG, and RMIG groups respectively (in the latter group all subjects reported having picked up the implicitly stated goal at the orientation meeting, even if only 11 percent of them reported having adopted it). χ^2 test was used comparing, from one group to the other, subjects who reported having adopted the prescribed goal and subjects who reported not having adopted it. This test yielded no significant differences in reported goal-adoption between the CIMEG and RMEG groups and between the RMEG and RMIG groups. Differences between the CIMEG and RMIG groups, however, were found to be significant, corrected $\chi^2 (1) = 8.8.$, $p < .01$. This

indicated that a greater number of subjects reported having aimed at the prescribed goal when it was explicitly stated as compared to when it was implicitly stated.

Finally, attempts were made at finding some approximative equivalence between caloric intake and restraint monitoring. One way of determining this equivalence was to look at the amount of weight lost. An average weight loss of 1 pound per week requires an average reduction of 500 calories per day (Bray, 1972). Some equivalence in terms of restraints could be established by analysing the daily average number of restraints for subjects having approximately lost in average 1 pound per week (irrespective of the particular restraint monitoring group they belonged to). Such an analysis was done. One first computation, in which weight loss only was taken into account, involved 11 subjects whose average weight loss ranged from 0.75 to 1.25 pound per week (with a mean of 0.93 pound). Their daily average number of restraints was 4.51. A second computation, which also took weight loss only into consideration, involved 5 subjects (of the 11 subjects involved in the first computation) whose average weight loss ranged from 0.90 to 1.10 pound per week (with a mean of 1.00 pound). Their daily average number of restraints was 4.88. A third computation involved 5 subjects (of the 11 subjects involved in the first computation) who had a similar number of pounds to lose ranging from 25 to 30 pounds (with a mean of 27 pounds). This is to say that the third computation took into account variables such as sex, age, height, and frame size in addition to weight loss per se. For these 5 subjects the daily

average number of restraints was 4.28. These figures then suggested that an average weight loss of 1 pound per week could approximately be equivalent to four to five restraints per day. The small number of subjects having approximately lost in average 2 pounds per week did not allow various computations as for subjects having lost in average 1 pound per week. Two subjects whose weight loss ranged from 1.71 to 2.31 pounds per week (with a mean of 2.01 pounds) were considered. Their daily average number of restraints was 7.33 and 9.39 respectively, i.e., an average of 8.36 restraints per day. The latter figure had to be taken with more caution than the previous ones, given the small number of subjects involved in the computation.

Summary

One purpose of the pilot experiment was to compare the effectiveness of restraint monitoring with that of caloric intake monitoring for weight reduction. The results suggested that restraint monitoring was indistinguishable in effect from caloric intake monitoring. Restraint monitoring (combined with either an explicit or implicit goal) generated the same amount of weight loss at the end of Week 4 as caloric intake monitoring (combined with an explicit goal). The trend or pattern of results, however, provided some indication that caloric intake monitoring was associated with more constant weight loss effects across time than restraint monitoring.

The second purpose of the pilot experiment was to test further the

contribution of goal-setting instructions to self-monitoring effectiveness. Self-monitoring combined with goal-setting instructions seemed to produce, as predicted, greater effects than self-monitoring without goal-setting instructions, at least for Week 4. This was supported by the fact that the RMNG group, which generated the smallest weight loss at the end of Week 4 as compared to the CIMEG, RMEG, and RMIG groups, was the only group in which no subject reported having set any specific goal for himself/herself.

The third intent of the pilot experiment was to look at the use of implicit as compared to explicit goals in a self-monitoring situation. It was found that an instruction set containing an implicit goal (as for the RMIG group) was as effective in producing weight loss as was an instruction set containing an explicit goal (as for the CIMEG and RMEG groups). However, there was some suggestion that an implicitly stated goal could actually be adopted by a smaller proportion of subjects than an explicitly stated goal.

CHAPTER III

EXPERIMENT 1

Experiment 1 was designed primarily to look at the issue of differential goal-setting (discussed in the introduction chapter). The pilot experiment indicated that self-monitoring combined with a goal did facilitate weight loss as compared to self-monitoring combined with no goal. The question now was the influence of various goal levels on the effectiveness of self-monitoring for inducing weight loss. Caloric intake was used as unit of monitoring.

Experiment 1 involved four experimental groups: a caloric intake monitoring-no goal group, a caloric intake monitoring-low goal group, a caloric intake monitoring-moderate goal group, and a caloric intake monitoring-high goal group. The no goal group was included as a useful comparison group and as a systematic replication of the no goal group in the pilot experiment (see Sidman, 1960). It was decided to drop the implicit goal group, since the pilot experiment suggested that the use of an implicit goal was as effective as the use of an explicit goal in a self-monitoring situation and that an implicit goal could be adopted by a smaller proportion of subjects than an explicit goal.

Finally, as a result of the experience gained in the pilot experiment, a number of procedural changes were made with the aim of increasing

efficiency. One first change referred to the second criterion for inclusion in the experiment (i.e., a minimum of 10 percent overweight). The pilot experiment revealed difficulties in assessing percentage overweight reliably. Actually, similar difficulties have been encountered by other authors (Bellack & Rozensky, 1975). The major difficulty was to determine the desirable weight. The latter had to be assessed by using height and weight tables (the 1969 Metropolitan Life Insurance Company tables) which provided a range of weights for each of three frame sizes for different sexes and heights. However, neither guidelines as to how to determine frame size nor guidelines as to what number within the range to select were given (actually, frame size was determined by visual inspection of each subject and the midpoint of each range was chosen as the criterion). Given these difficulties, it was decided to utilize in Experiment 1 a criterion already used by other investigators, i.e., a desire to lose at least 15 pounds (Bellack, 1976; Bellack, Rozensky, & Schwartz, 1974; Bellack, Schwartz, & Rozensky, 1974; Rozensky & Bellack, 1976).

A second change referred to the screening process. In the pilot experiment subjects were screened through a telephone interview followed by a brief individual interview with the experimenter. The main purpose of this individual interview was to assess percentage overweight by taking height and weight measurements. Since subjects in Experiment I were not to be selected on the basis of percentage overweight, there was no necessity of having an individual screening interview with each subject prior to the orientation meeting. Moreover, the pilot experiment

revealed that issues such as the prequestionnaire, the deposit, and the signature could easily be handled at each separate orientation meeting. Therefore it was decided to proceed directly from a telephone screening interview to the first group meeting. Actually, such a procedure has also been used in the past by other investigators (Bellack, 1976; Bellack, Rozensky, & Schwartz, 1974; Bellack, Schwartz, & Rozensky, 1974).

A third change had to do with the weekly weigh-ins. While subjects in the pilot experiment were asked to come in at the end of each week to be weighed by the experimenter or the assistant and to have their self-monitoring cards collected, subjects in Experiment 1 were to be required to meet individually with the experimenter only at the end of Week 2 (at Week 1 and Week 3, they would drop in once at the end of the week, and at the end of Week 4 they would meet as a group). This change was made for practical reasons mainly. Experiment 1 being run at the same time that Experiment 2 (to be reported later) with only a 1-week delay between the two, it simply appeared impossible to meet individually each week with so many subjects. However, the fact of having one individual meeting insured contact with subjects. As suggested by previous research (Bellack, Schwartz, & Rozensky, 1974), the degree of contact with subjects is less important than the presence or absence of contact.

A fourth change referred to the way of setting daily caloric intake goals. Subjects in the CIMEG group of the pilot experiment were assigned a standardized goal commonly used in studies incorporating some limitation on caloric intake. Since the CIMEG group served as a comparison

group for assessing the effectiveness of restraint monitoring, the use of a standardized goal was justified. In Experiment 1, however, the goal had to be made more specific and distinct levels of goal had to be established. One way of setting specific and distinct levels of caloric intake goal was to determine, for each subject, the daily maintenance calories, i.e., the daily number of calories needed to maintain the desirable weight (which depends itself upon individual characteristics such as sex, age, height, and frame size). Then the number of calories needed to lose at various rates could be figured out. One would expect 500, 750, and 1000 calories less than the daily maintenance calories to produce an average weight loss of approximately 1.0, 1.5, and 2.0 pounds per week respectively. As indicated previously, an average weight loss of 1 to 2 pounds per week (i.e., 1.5 pound) is usually considered as a moderate goal (Hall & Hall, 1974). Therefore it was decided to use 500, 750, and 1000 calories less than daily maintenance calories as a low, moderate, and high goal respectively.

Method

Subjects

Subjects for Experiment 1 were selected simultaneously with subjects for Experiment 2. An advertisement inviting males and females to participate in a research project concerning weight control was placed in the student newspaper of the University of Ottawa and at the information

service of the university centre of the University of Ottawa and Carleton University (see Appendix H). To be eligible participants had to meet the same criteria as for the pilot experiment with the exception of criterion (b) which was replaced by "a desire to lose at least 15 pounds". They also had to meet the two additional conditions described in the pilot experiment.

Of the 139 people who answered the advertisement, 120 met the criteria and conditions and were selected. These 120 subjects were then randomly assigned to one of two groups of 60. The first group was used for Experiment 1, the second for Experiment 2.

Of the 60 subjects (46 females, 14 males) assigned to Experiment 1, 72 percent were students and the remainder were nonstudents. Ages ranged from 18 to 45 years with a mean of 25.4 years.

Experimenter and Assistant

The author served as experimenter. The female undergraduate student who had served as assistant in the pilot experiment also served as assistant in Experiment 1. Roles were the same as in the pilot experiment.

Procedure

The overall procedure can be summarized as follows: telephone screening interview, first group meeting (orientation meeting), three individual weekly weigh-ins, and final group meeting. As in the pilot

experiment the differential treatment was applied during the first group meeting (orientation meeting). All other meetings were nondifferential for the four experimental groups.

Prospective subjects first called the experimenter who screened them over the telephone. After having given them general information about the program he ensured that basic requirements were met. Particular attention was paid to the second criterion by checking applicants' weight against the 1969 Metropolitan Life Insurance Company norms in order to assess whether or not their desire to lose 15 pounds was reasonable. He also told them about the two additional conditions for participating in the program and collected information concerning their free times. Subjects who did not meet the criteria and conditions were immediately refused. Those who met the criteria and conditions were told that within 2 or 3 weeks they would be contacted by telephone and given the time and place of the first group meeting (orientation meeting). Within that delay a few subjects called back to tell the experimenter that they did not wish to participate in the program. These subjects are included among the 139 who answered the advertisement but are not among those who were finally selected.

Following the telephone screening interviews the 60 subjects selected for Experiment 1 were randomly assigned to one of the four experimental groups. Each group was composed of 15 subjects. Then each subject was contacted and invited to the appropriate experimental group orientation meeting.

Separate orientation meetings were conducted by the experimenter for each group. The experimenter conducted each meeting alone without being accompanied by the assistant. At the beginning of the meeting subjects completed a prequestionnaire inquiring about the history of their weight problems, their motivation to lose weight, and their expectation with regards to the anticipated success of the present program (see Appendix I). Then the procedures were described from a prepared script. According to experimental conditions procedures varied as follows.

Caloric Intake Monitoring-No Goal Group (CIMNG). The procedure for this group was the same as for the CIMEG group in the pilot experiment except that no daily caloric intake goal was set and the procedure for the weekly weigh-ins was modified (see Appendix D for the full script). Subjects were first reminded of the experimental nature of the program and presented with factual information concerning causes of being overweight. An emphasis was put on the view that being overweight represents an imbalance between caloric intake and energy expenditure. Factual information pertaining to nutrition was also provided but no special or preset diet was prescribed.

Then subjects were presented with a rationale for the details of the so-called preliminary stage of the program. They were asked to monitor daily caloric intake for all foods and beverages ingested for the next 4 weeks (the monitoring was to be done immediately after each occasion of eating or drinking). A calorie-counting booklet and daily

self-monitoring cards were given to each subject as well as instructions on how to use them.

At the end of the orientation meeting each subject chose one of the available times for meeting individually with the experimenter 2 weeks later. Weight and height measurements were also taken by either the assistant or the experimenter depending on the sex of the subject. Weight to the nearest quarter of a pound was obtained on a Detecto medical balance scale. Subjects were weighed without shoes in hospital disposable gowns in a washroom close to the experimenter's office. Height was measured to the nearest inch without shoes. Finally subjects were required to give their deposit and to sign a statement saying that they were participating in the program on a voluntary basis and accepted responsibility for their involvement (see Appendix J).

Subjects were also requested to come in at the end of each week for the next 3 weeks to weigh-in and to bring back their self-monitoring cards. With the exception of Week 2 they did not meet individually with the experimenter. They simply dropped in at the end of each week, weighed themselves without clothes in the washroom close to the experimenter's office, registered their weight on the back of one of their self-monitoring cards, and put their self-monitoring cards for the preceding week in a box placed in the washroom. For Week 2 the procedure was the same except that before or after weighing themselves they met individually with the experimenter for about 5 to 10 minutes. The main purpose of this meeting was to insure contact with subjects.

At the end of the fourth week following the orientation meeting subjects were seen again as a group. They were weighed by the experimenter or assistant and their self-monitoring cards (for the fourth week) were collected. They were also required to complete a postquestionnaire inquiring about how they dealt with the preliminary stage (see Appendix K). Then the second phase of the program was introduced.

The focus of Experiment 2 was on the first phase of the program, that is, the self-monitoring phase. As in the pilot experiment the second phase was included as a service to the subjects. No data was collected for the second phase (see Appendix F for a detailed account of the content of the second phase).

Caloric Intake Monitoring-Low Goal Group (CIMLG). The procedure in this group was identical to that of the CIMNG group except that after self-monitoring instructions had been completed, information concerning a reasonable level of intake to aim for was given and a low daily caloric intake goal was set individually for each subject (see Appendix D for the full script). Subjects were required to restrict their daily caloric intake to 500 calories less than their individually determined daily maintenance level. At the end of the orientation meeting, after weight and height measurements had been taken and before the deposit was collected, the daily maintenance level for each subject was determined by using the tables provided by Bellack, Rozensky, and Schwartz (1974) (see Appendix L).

Caloric Intake Monitoring-Moderate Goal Group (CIMMG). The procedure

for this group was exactly the same as for the CIMLG group except that a moderate daily caloric intake goal was set individually for each subject (see Appendix D for the full script). Subjects were asked to restrict their daily caloric intake to 750 calories less than their individually determined daily maintenance level. The daily maintenance level for each subject was determined as in the CIMLG group by reference to the tables provided by Bellack, Rozensky, and Schwartz (1974).

Caloric Intake Monitoring-High Goal Group (CIMHG). The procedure for this group was also exactly the same as for the CIMLG except that a high daily caloric intake goal was set individually for each subject (see Appendix D for the full script). Subjects were required to restrict their daily caloric intake to 1000 calories less than their individually determined daily maintenance level. The daily maintenance level for each subject was again determined by reference to the tables provided by Bellack, Rozensky, and Schwartz (1974).

Results

As in the pilot experiment only subjects who completed the 4-week self-monitoring phase of the program were included in the data analysis. Of the 60 subjects selected for the first experiment, 7 did not finish the self-monitoring phase. In the CIMHG group, one subject (a female) did not even start the program, one (a female) did not participate further after the orientation meeting, and one (a female) dropped out in the course of the program; in the CIMLG group, one subject (a female)

dropped out in the course of the program; in the CIMMG group, one subject (a female) did not participate further after the orientation meeting; in the CIMHG group, two subjects (females) dropped in the course of the program. The final sample consisted of 12, 14, 14, and 13 subjects in the CIMNG, CIMLG, CIMMG, and CIMHG groups respectively.

Raw weight data were converted to percentage body weight and all statistical analyses, which were similar to those used in pilot-experiment, were performed on the converted scores. Table 4 presents the average percentage body weight at each measurement point (including pretreatment measurement) for each experimental group.

Table 4
Average Percentage Body Weight at Each
Measurement Point for All Groups

Group	<u>n</u>	Pretreatment	End of Week 1	End of Week 2	End of Week 3	End of Week 4
CIMNG	12	100	99.71	99.53	99.09	99.07
CIMLG	14	100	98.21	97.76	96.61	96.34
CIMMG	14	100	98.26	97.31	96.50	96.44
CIMHG	13	100	97.97	96.99	96.90	97.07

Percentage body weight scores were analysed by a two-way analysis of variance (monitoring groups x time) with repeated measures on one factor (time). The time factor represented the weekly measurements. This ana-

lysis indicated a significant main effect for monitoring groups, $F(3,49) = 4.48$, $p < .01$; and a significant main effect for time, $F(3,147) = 18.02$, $p < .01$; but no significant monitoring groups x time interaction. A summary of the two-way analysis of variance is contained in Table 5.

Table 5
Summary of Two-way Analysis of Variance

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Monitoring groups (A)	3	57.70	4.48*
Subjects within groups	49	12.85	
Time (B)	3	19.98	18.02*
A X B	9	1.59	1.43
B X Subjects within groups	147	1.10	

* $p < .01$

Comparisons among the monitoring group means, using Tukey's Test, revealed that the CIMNG group was significantly different from the CIMLG group, $q(4,49) = 4.31$, $p < .05$; significantly different from the CIMMG group, $q(4,49) = 4.52$, $p < .05$; and significantly different from the CIMHG group, $q(4,49) = 4.30$, $p < .05$ - indicating a smaller weight loss associated with the former than the latter. However, the CIMLG, CIMMG, and CIMHG groups were not found to differ among themselves, each of these

groups generating approximately the same amount of weight loss. Comparisons among the time means, using Tukey's Test, showed that weight at the end of Week 1 was significantly different from weight at the end of Week 2, $q(4,147) = 4.47$, $p < .05$; at the end of Week 3, $q(4,147) = 8.91$, $p < .01$; and at the end of Week 4, $q(4,147) = 9.25$, $p < .01$. They also showed that weights at the end of Week 2 and Week 3 significantly differed from each other, $q(4,147) = 4.43$, $p < .05$; as did weights at the end of Week 2 and Week 4, $q(4,147) = 4.77$, $p < .01$. However, weights at the end of Week 3 and Week 4 were not found to be significantly different. This indicated that maximum weight loss occurred at the end of Week 3 not Week 4. Figure 2 presents mean percentage body weight from pretreatment to Week 4 for the four experimental groups.

A trend analysis of the main effect of the time factor revealed that the linear trend component was significant, $F(1,49) = 26.77$, $p < .01$; and that the quadratic trend component was significant, $F(1,49) = 5.96$, $p < .05$. Most of the effect of this factor, however, was accounted for by the linear component. In terms of percentages, the linear component represented 90.86 percent ($54.488 / 59.968 \times 100$) of the main effect of the time factor, whereas the quadratic component represented only 7.72 percent ($4.632 / 59.968 \times 100$). This analysis, reported in Table 6, indicated that weight regularly decreased with time (linear trend) up to a certain point (Week 3) after which this tendency slowed down (Week 4) as if the direction was going to change (slight quadratic trend).

An additional analysis was performed to compare the number of subjects

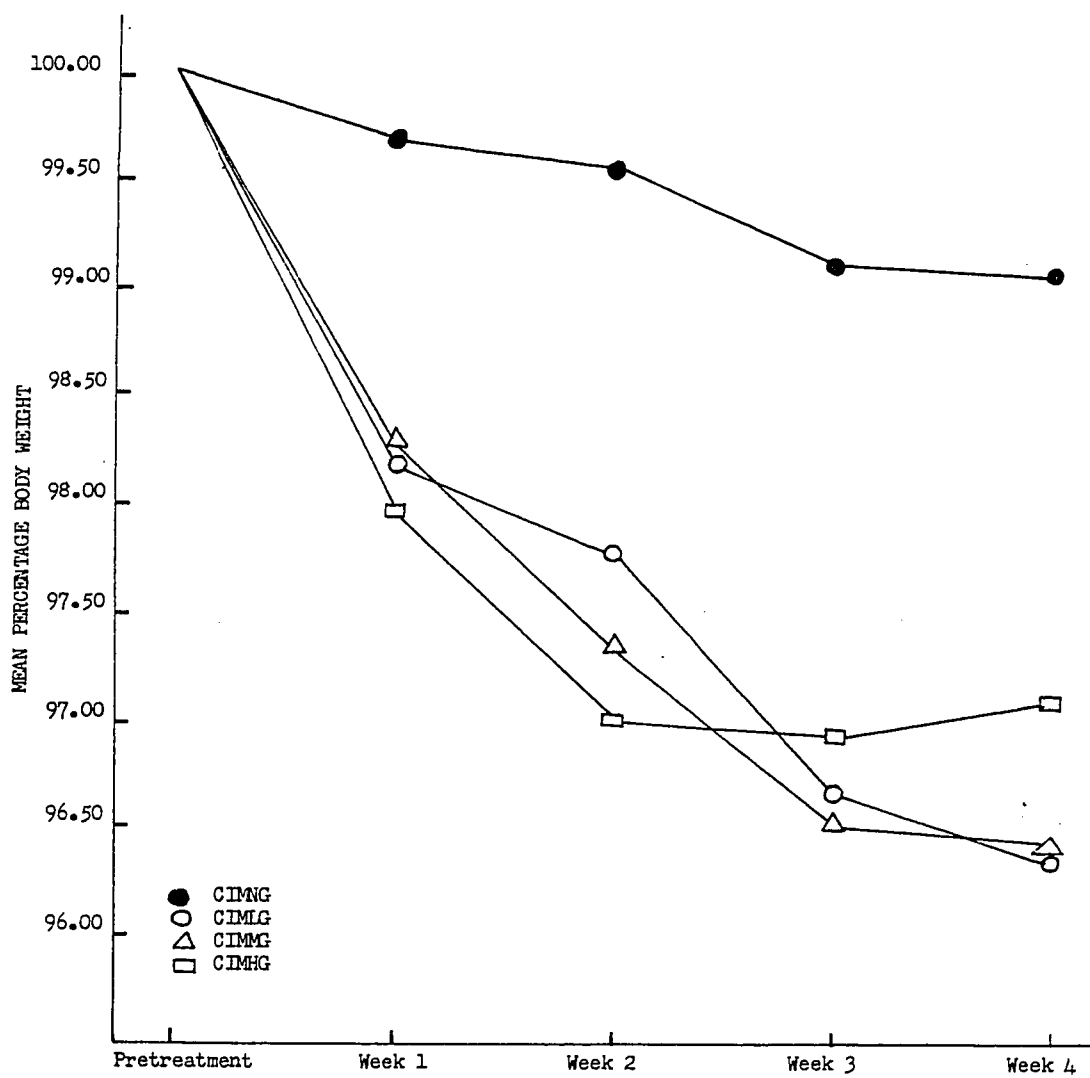


Figure 2. Mean Percentage Body Weight from Pretreatment to Week 4 Across Experimental Groups.

Table 6
Summary of Trend Analysis

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Monitoring groups (A)	3	57.70	4.48**
Subjects within groups	49	12.85	
Time (B)	3	19.98	18.02**
Linear trend	1	54.48	26.77**
Quadratic trend	1	4.63	5.96*
Cubic trend	1	0.84	1.64
A X B	9	1.59	1.43
Linear trend	3	3.39	1.66
Quadratic trend	3	0.82	1.06
Cubic trend	3	0.56	1.09
B X Subjects within groups	147	1.10	
B X Subjects within groups (linear)	49	2.03	
B X Subjects within groups (quadratic)	49	0.77	
B X Subjects within groups (cubic)	49	0.51	

*
 $p < .05$

**
 $p < .01$

who attained the daily caloric intake prescribed goal in the relevant groups. As in the pilot experiment goal-attainment was assessed from the self-monitoring cards subjects brought back each week. Actually, subjects attained the daily prescribed goal in a proportion of 84.6 percent, 53.8 percent, and 41.6 percent in the CIMLG, CIMMG, and CIMHG groups respectively. Comparisons among groups, using χ^2 test, showed that differences in goal-attainment between the CIMLG and CIMHG groups were significant, corrected $\chi^2 (1) = 3.30, p < .05$. All other comparisons were not significant. This indicated a greater goal-attainment with a low goal as compared with a high goal, but not with a low goal as compared with a moderate goal or with a moderate goal as compared with a high goal.

An analysis was conducted to compare, in each relevant group as well as in the relevant groups combined, the average percentage body weight at the end of Week 4 of subjects who attained their daily caloric intake goal with the average percentage body weight of subjects who did not. For each of these comparisons, a t test for unrelated samples was used. The results indicated no significant differences in weight loss between subjects who attained their goal and those who did not in the CIMLG group, the CIMMG group, and the CIMHG group. When these three groups were pooled together, differences between subjects who achieved their goal and subjects who did not approached but did not attain traditional levels of significance, $t (36) = 2.00, p < .08$ - suggesting a tendency for the formers to lose more weight than the latter at the

end of Week 4.

Comparisons were also established between the average percentage body weight at the end of Week 3 of subjects who achieved their daily prescribed goal and the average percentage body of subjects who did not. A t test for unrelated samples was again used for each comparison. The results showed significant differences in weight loss between those who attained their goal and those who did not in the CIMLG group, $t(11) = 3.46$, $p < .01$; in the CIMHG group, $t(10) = 2.46$, $p < .05$; but not in the CIMMG group. When the CIMLG, CIMMG, and CIMHG groups were pooled together, significant differences were found between subjects who did achieve their goal and those who did not, $t(36) = 2.42$, $p < .02$ - indicating a greater weight loss for the formers than the latters at the end of Week 3.

The pre- and postquestionnaire data of Experiment 1 were analysed in combination with the pre- and postquestionnaire data of Experiment 2 and are presented later.

Summary

The main purpose of Experiment 1 was to assess the influence of differential goal-setting on self-monitoring effectiveness with caloric intake serving as unit of monitoring. Various levels of goal did not appear to affect self-monitoring effects differentially. Whether combined with a low, a moderate, or a high goal, caloric intake monitoring generated approximately the same amount of weight loss over a 4-week period.

One finding of the pilot experiment was replicated in Experiment I. Self-monitoring combined with a goal (irrespective of the particular level of goal used) clearly produced more effects than self-monitoring combined with no goal, the former generating a greater weight loss at the end of Week 4 than the latter. Moreover, goal-setting (irrespective of the various levels of goal set) seemed to contribute to self-monitoring by critically augmenting whatever effects self-monitoring alone might have had. Even if the pattern of the effects of self-monitoring combined with no goal was similar to the pattern of the effects of self-monitoring combined with a goal, the magnitude of the effects of the former was smaller than the magnitude of the effects of the latter.

CHAPTER IV

EXPERIMENT 2

Experiment 2 had the same purpose as Experiment 1 in that it was designed to look at the effects of self-monitoring as a function of various goal levels, with the difference that restraint was used as monitoring unit. The pilot experiment suggested that restraint monitoring was indistinguishable in effect from caloric intake monitoring, and that restraint monitoring combined with a goal produced the same amount of weight loss as caloric intake monitoring combined with a goal. On the other hand, Experiment 1 showed that the effects of self-monitoring did not vary as a function of differential goal-setting with caloric intake serving as unit of monitoring. The question now was the influence of various levels of goal on self-monitoring effectiveness for inducing weight loss with restraint serving as monitoring unit.

Experiment 2 involved four experimental groups: a restraint monitoring-no goal group, a restraint monitoring-low goal group, a restraint monitoring-moderate goal group, and a restraint monitoring-high goal group. The no goal group was included as a comparison group and as a systematic replication of the no goal group in the two previous experiments.

Finally, the procedural changes made in Experiment 1 were maintained

in Experiment 2. With regard to the various levels of daily restraint goal set, they were determined on the basis of the figures computed in the pilot experiment. These computations suggested that an average weight loss of 1.0, 1.5, and 2.0 pounds per week could be equivalent to approximately 4, 7, and 10 restraints per day respectively. Therefore it was decided to use 4, 7, and 10 restraints per day as a low, moderate, and high goal respectively.

Method

Subjects

Subjects for Experiment 2 were selected at the same time as the subjects for Experiment 1. An advertisement inviting males and females to participate in a research project concerning weight control was placed in the student newspaper of the University of Ottawa and at the information service of the university centre of the University of Ottawa and Carleton University (see Appendix H). The criteria and conditions for inclusion in Experiment 2 were exactly the same as those for Experiment 1.

Of the 139 people who answered the advertisement, 120 met the criteria and conditions and were selected. These 120 subjects were then randomly assigned to one of two groups: the first group of 60 served as subjects for Experiment 1, the second group of 60 as subjects for Experiment 2.

Of the 60 subjects (47 females, 13 males) assigned to Experiment 2,

70 percent were students and 30 percent were nonstudents. Ages ranged from 18 to 44 years with a mean of 24.0 years.

Experimenter and Assistant

The author served as experimenter and the female undergraduate student who served as assistant in the pilot experiment and Experiment 1 also served as assistant in Experiment 2. Their respective roles were the same as in the pilot experiment and Experiment 1.

Procedure

The overall procedure can be summarized as follows: telephone screening interview, first group meeting (orientation meeting), three individual weekly weigh-ins, and final group meeting. With the exception of the first group meeting (orientation meeting) during which the differential treatment was applied, all meetings were nondifferential for the four experimental groups.

Potential subjects were screened over the telephone as described for Experiment 1 (see p. 75). Following the telephone screening interviews the 60 subjects selected for Experiment 2 were randomly assigned to one of the four experimental groups. Each group was composed of 15 subjects. Then each subject was contacted and invited to an appropriate experimental group orientation meeting (Experiments 1 and 2 were conducted concomitantly; so subjects for Experiments 1 and 2 were contacted at the

same time but the orientation meetings for Experiment 2 were scheduled with a 1-week delay).

Separate orientation meetings were conducted by the experimenter for each group. At the beginning of the meeting subjects were requested to fill out the same prequestionnaire as was used in Experiment 1 (see Appendix I). Then the procedures were described from a prepared script. According to experimental conditions procedures varied as follows.

Restraint Monitoring-No Goal Group (RMNG). The procedure for this group was the same as for the RMNG group in the pilot experiment except that the procedure for dealing with the weekly weigh-ins was modified (see Appendix G for the full script). Subjects were first reminded that the program was part of a research project and were presented with factual information concerning causes of being overweight. An emphasis was put on viewing being overweight as representing an imbalance between food intake and energy expenditure. They were also provided with information pertaining to nutrition but no special or preset diet was prescribed.

To introduce the details of the so-called preliminary stage of the program a rationale was presented on the basis of which subjects were first asked to self-monitor the number of times they restrained their food intake each day for the next 4 weeks (the monitoring was to be done immediately after each restraint). Self-monitoring cards were given to each subject as well as instructions on how to use them. Particular attention was paid to clearly specifying what was meant by a restraint and examples of instances of restraint were provided. Subjects were instructed to record a restraint whenever they felt an urge to eat and

did not eat and/or whenever they consciously reduced their food intake (e.g., but putting less food on the plate or eating less of the food on the plate).

At the end of the orientation meeting subjects were asked to select one of the available times for meeting individually with the experimenter 2 weeks later. They were also asked to have their weight and height measured. These measurements were taken as in Experiment 1 (see p. 77). Finally, subjects were requested to give their deposit and to sign a statement saying that they were participating in the program on a voluntary basis and accepted responsibility for their involvement (see Appendix J).

Subjects were also required to come in at the end of each week for the next 3 weeks to weigh-in and to bring back their self-monitoring cards. The procedure for the three consecutive weigh-ins was the same as the one used in Experiment 1 (see p. 77).

At the end of the fourth week following the orientation meeting subjects were seen again as a group. They were weighed and their self-monitoring cards (for the fourth week) were collected. They completed a post-questionnaire inquiring about how they dealt with the preliminary stage (see Appendix K). Then the second phase of the program was introduced.

As with the pilot experiment and Experiment 1 the focus of Experiment 2 was on the self-monitoring phase of the program. The second phase was included as a service to the subjects and no data was collected on this phase (see Appendix F for a detailed account of the content of

the second phase).

Restraint Monitoring-Low Goal Group (RMLG). With one exception the procedure for this group was identical to that of the RMNG group. The exception was that after self-monitoring instructions had been completed, information concerning reasonable levels of restraint to exercise was given and a low daily restraint goal was set (see Appendix G for the full script). Subjects were asked to exercise four restraints per day.

Restraint Monitoring-Moderate Goal Group (RMMG). The procedure for this group was exactly the same as for the RMLG group except that a moderate daily restraint goal was set (see Appendix G for the full script). Subjects were required to exercise seven restraints per day.

Restraint Monitoring-High Goal Group (RMHG). The procedure for this group was also exactly the same as for the RMLG group except that a high daily restraint goal was set (see Appendix G for the full script). Subjects were asked to exercise 10 restraints per day.

Results

Only subjects who completed the 4-week self-monitoring phase of the program were included in the data analysis. Of the 60 subjects selected for the second experiment, 6 did not finish the self-monitoring phase. In the RMLG group, one subject (a male) dropped out in the course of the program; in the RMMG group, two subjects (a male and a female) also dropped out in the course of the program; in the RMHG group, two subjects (females) did not participate further after the orientation meeting and

one (a female) dropped out in the course of the program. The final sample consisted of 15, 14, 13, and 12 subjects in the RMNG, RMLG, RMMG, and RMHG groups respectively.

Raw weight data were converted to percentage body weight and all statistical analyses, which were similar to those used in the previous experiments, were conducted on the converted scores. The average percentage body weight at each measurement point (including pretreatment measurement) for each experimental group is presented in Table 7.

Table 7
Average Percentage Body Weight at Each
Measurement Point for All Groups

Group	<u>n</u>	Pretreatment	End of Week 1	End of Week 2	End of Week 3	End of Week 4
RMNG	15	100	98.73	98.46	97.78	98.09
RMLG	14	100	99.02	98.14	97.52	98.08
RMMG	13	100	98.23	98.14	97.39	98.51
RMHG	12	100	99.27	98.96	97.97	98.23

Percentage body weight scores were analysed by a two-way analysis of variance (monitoring groups x time) with repeated measures on one factor (time). The time factor represented the weekly measurements. This analysis showed no significant main effect for monitoring groups; a signi-

ficant main effect for time, $F(3,150) = 17.73$, $p < .01$; and no significant monitoring groups x time interaction. Table 8 summarizes the two-way analysis of variance.

Table 8
Summary of Two-way Analysis of Variance

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Monitoring groups (A)	3	2.64	0.44
Subjects within groups	50	5.93	
Time (B)	3	12.20	17.73*
A X B	9	1.04	1.52
B X Subjects within groups	150	0.68	

*
 $p < .01$

Comparisons among the time means, using Tukey's Test, revealed that weight at the end of Week 1 was significantly different from weight at the end of Week 3, $q(4,150) = 10.10$, $p < .01$; and at the end of Week 4, $q(4,150) = 5.17$, $p < .01$; but not at the end of Week 2. The comparisons also showed that weights at the end of Week 2 and Week 3 were significantly different from each other, $q(4,150) = 6.64$, $p < .01$; as were weights at the end of Week 3 and Week 4, $q(4,150) = 4.93$, $p < .01$. Weights at the end of Week 2 and Week 4, however, were not found to be significantly different. This indicated that maximum weight loss occurred at the end

of Week 3. Figure 3 presents mean percentage body weight from pre-treatment to Week 4 across experimental groups.

A trend analysis of the main effect of the time factor, reported in Table 9, showed that the linear trend component was significant, $F(1,50) = 16.18, p < .01$; that the quadratic trend component was significant, $F(1,50) = 19.38, p < .01$; and that the cubic trend component was significant, $F(1,50) = 19.21, p < .01$. Each of these components accounted for an important portion of the effect of the time factor. In terms of percentages, the linear, quadratic, and cubic components represented 46.15 percent ($16.902 / 36.619 \times 100$), 32.76 percent ($11.999 / 36.619 \times 100$), and 21.07 percent ($7.718 / 36.619 \times 100$) of the main effect of the time factor respectively. This analysis indicated that weight first showed a reduction with time (linear trend), then decreased more markedly (quadratic trend), and finally tended to increase (cubic trend).

An additional analysis was conducted to compare the number of subjects who achieved the daily restraint prescribed goal in the relevant groups. As in the previous experiments goal-attainment was determined on the basis of self-monitoring cards subjects brought back each week. In the RMLG, RMMG, and RMHG groups, subjects actually attained the daily prescribed goal in a proportion of 64.2 percent, 30.7 percent, and 10.0 percent respectively. Comparisons among groups, using χ^2 test, revealed that differences in goal-attainment between the RMLG and RMHG groups were significant, corrected $\chi^2(1) = 5.01, p < .05$. All other comparisons were not significant. This indicated a greater goal-attainment with a low goal as compared with a high goal, but not with a low goal as compared

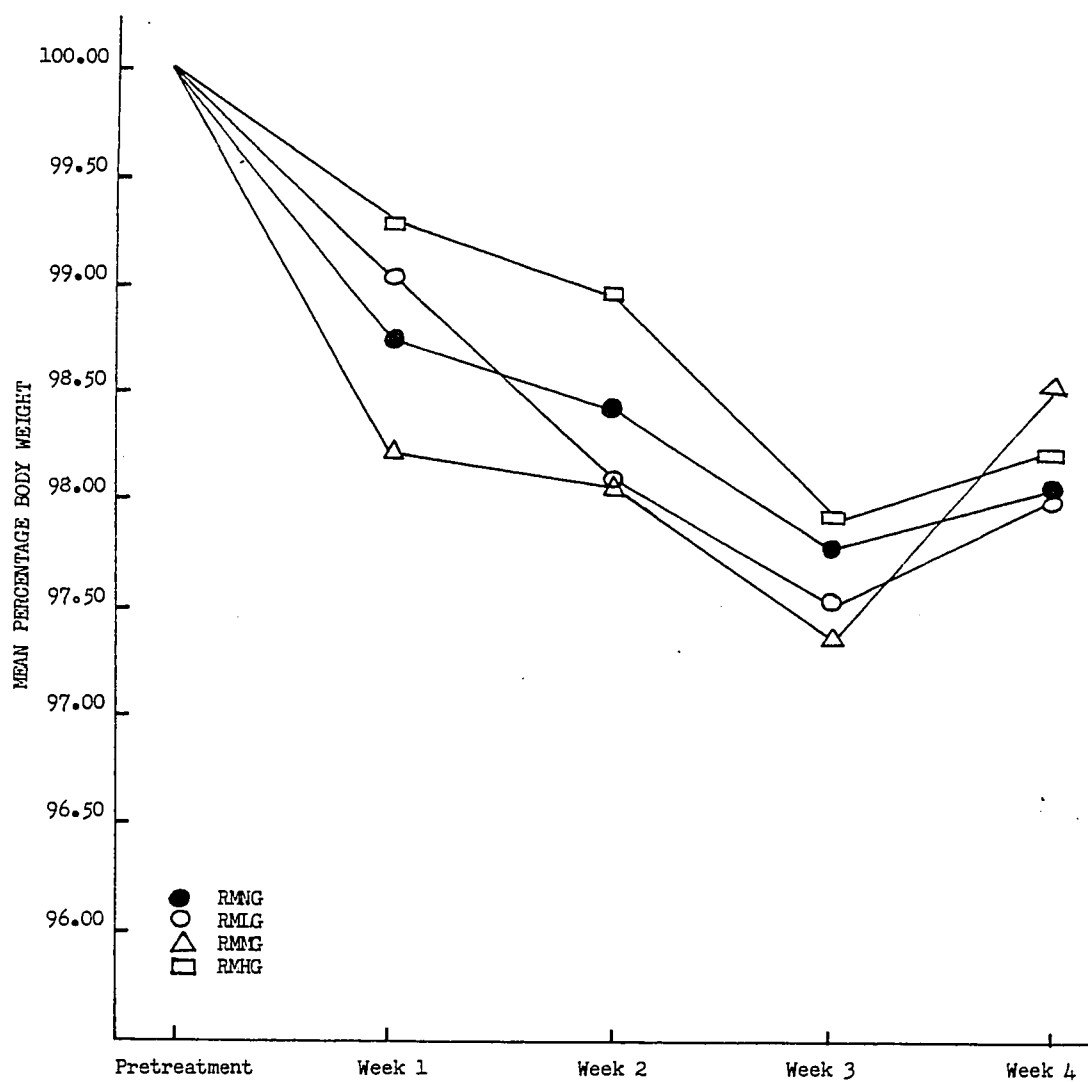


Figure 3. Mean Percentage Body Weight from Pretreatment to Week 4 Across Experimental Groups.

Table 9
Summary of Trend Analysis

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Monitoring groups (A)	3	2.64	0.44
Subjects within groups	50	5.93	
Time (B)	3	12.20	17.73*
Linear trend	1	16.90	16.18*
Quadratic trend	1	11.99	19.38*
Cubic trend	1	7.71	19.21*
A X B	9	1.04	1.52
Linear trend	3	2.14	2.05
Quadratic trend	3	0.67	1.09
Cubic trend	3	0.32	0.81
B X Subjects within groups	150	0.68	
B X Subjects within groups (linear)	50	1.04	
B X Subjects within groups (quadratic)	50	0.61	
B X Subjects within groups (cubic)	50	0.40	

*
p < .01

with a moderate goal or with a moderate goal as compared with a high goal.

An analysis was performed to compare the average percentage body weight at the end of Week 4 of subjects who attained their daily restraint goal with the average percentage body weight of subjects who did not. For each comparison, a t test for unrelated samples was used. In the RMLG, RMMG, and RMHG groups, no significant differences in weight loss were found between subjects who did achieve their goal and those who did not. When these three groups were pooled together, no significant differences were found either, indicating that goal-attainment did not foster greater weight loss at the end of Week 4 than no goal-attainment with restraint monitoring.

Comparisons were also established between the average percentage body weight at the end of Week 3 of subjects who achieved their daily goal and the average percentage body weight of subjects who did not. Again, a t test for unrelated samples was used for each comparison. The results indicated no significant differences in weight loss between those who attained their goal and those who did not in the RMLG group, the RMMG group, and the RMHG group. When these three groups were pooled together, no significant differences in weight loss at the end of Week 3 were found either.

Summary

The primary intent of Experiment 2 was to assess the effects of self-

monitoring as a function of differential goal-setting with restraint serving as monitoring unit. Various levels of goal did not seem to influence self-monitoring effectiveness differentially. Self-monitoring of restraint, whether combined with a low, a moderate, or a high goal, produced approximately the same amount of weight loss over the 4-week monitoring period.

Experiment 2 failed to replicate the previous finding that goal-setting enhanced self-monitoring effectiveness. Self-monitoring combined with a goal (irrespective of the particular level of goal used) produced no more effects than self-monitoring combined with no goal. The former and the latter generated equal amounts of weight loss at the end of Week 4. The similarity in the effects of both self-monitoring combined with a goal and self-monitoring combined with no goal included the reversal which showed up by the end of the monitoring period when the weight loss observed during the first 3 weeks was followed by a weight gain during the last week of self-monitoring.

CHAPTER V

QUESTIONNAIRE DATA

The pre- and postquestionnaire data of Experiment 1 were analysed in combination with those of Experiment 2. The main purpose of this analysis was to examine potential relationships between some variables measured in the questionnaires and weight loss. The prequestionnaire analysis comprised questions 2, 3, 8, 9, 10, 11, 12, 21, 22, and 23 (see Appendix I), whereas the postquestionnaire analysis entailed questions 2, 3, 4, 5, 8, 9, 11, and 14 (see Appendix K).

Prequestionnaire data of both Experiment 1 and Experiment 2 were first subjected to a factor analysis (using the principal factoring without iteration method, the varimax rotation, and a minimum eigenvalue of 1.0) which revealed the presence of four factors (accounting for 65.8 percent of the variance). Factor 1, on which the most loaded questions were questions 21 (0.78), 22 (0.87), and 23 (0.75), indicated that the stronger was the desire to lose weight, the greater was the effort made to lose weight and also the higher the expectation to lose weight; this factor was named Motivation to lose weight. Factor 2, on which the most loaded questions were questions 8 (0.81) and 9 (0.87), suggested that the fatter a subject perceived himself the more pounds he wanted to lose; this second factor was named Goal (in pounds). Factor 3, on which the most loaded questions were questions 2 (0.84) and 11 (0.70), indicated that subjects were old and reported having

experienced weight problems only at a late age; this third factor was named Age. Factor 4, on which questions 10 (-0.40) and 12 (0.89) appeared as the most loaded questions, suggested that if other members of their family had weight problems, subjects set smaller short-term goals for themselves; this fourth factor was given the name Family.

Then, in a second step, a multiple regression analysis was conducted, using the factor scores for each subject of both experiments on each of the four factors as predictor variables and the percentage body weight at the end of Week 4 as the criterion variable. This combined analysis failed to show a significant relationship between any of the four factors and weight at the end of Week 4.

Postquestionnaire data of both Experiment 1 and Experiment 2 were analysed in a similar way. First they were subjected to a factor analysis (using the principal factoring without interrotation method, the varimax rotation, and a minimum eigenvalue of 1.0) which showed the presence of three factors (accounting for 62.1 percent of the variance). Factor 1, on which the most loaded questions were questions 3 (0.57), 4 (0.76), and 11 (-0.79), indicated that subjects who set for themselves a daily goal (either caloric intake or restraint goal) perceived self-monitoring as having been effective in helping them to lose weight, although they were rather insatisfied with the program at the end of the 4-week self-monitoring period; this factor was named Daily goal. Factor 2, on which questions 2 (0.57), 8 (0.82), and 9 (0.79) were the most loaded questions, suggested that the more subjects complied with the self-monitoring instructions, the more they found the task hard and

aversive; this second factor was given the name Compliance. Factor 3, on which the most loaded questions were questions 5 (0.64) and 14 (-0.82), suggested that subjects belonging to an English Canadian cultural background had higher expectations to lose weight following the first group meeting than subjects belonging to a French Canadian or any other cultural background; this factor was named Cultural background.

A multiple regression analysis was then performed, using the factor scores as predictor variables and the percentage body weight at the end of Week 4 as the criterion variable. This combined analysis showed a significant relationship between the Daily goal factor and weight at the end of Week 4, $F(1,103) = 59.96$, $p < .01$. The Compliance factor and the Cultural background factor were not found to be significantly related to weight at the end of Week 4.

Separate multiple regression analyses were also performed for Experiment 1 and Experiment 2. Again, the factor scores served as predictor variables and the percentage body weight at the end of Week 4 served as the criterion variable. The separate analysis for Experiment 1 indicated that the Daily goal factor was significantly related to weight at the end of Week 4, $F(1,49) = 57.76$, $p < .01$; and that the Compliance factor and the Cultural background factor were not. With respect to Experiment 2, the separate analysis failed to show a significant relationship between any of the three factors and weight at the end of Week 4.

Thus, none of the factors contained in either the pre- or post-questionnaire was significantly related to the weight loss generated

at the end of the self-monitoring period, with the exception of the Daily goal factor contained in the postquestionnaire. However, the Daily goal factor appeared to be associated with weight loss at the end of the self-monitoring period when caloric intake was used as unit of monitoring but not when restraint served as unit of monitoring. The latter finding was consistent with and supported the overall results of both Experiment 1 and Experiment 2.

CHAPTER VI

GENERAL DISCUSSION

Four main issues were to be investigated in one or the other of the three experiments. The first issue was that of the contribution of goal-setting instructions to the effectiveness of self-monitoring applied to weight reduction. Each experiment yielded different results relative to this issue. When caloric intake served as the monitoring unit, as in Experiment 1, the effectiveness of self-monitoring with goal-setting (irrespective of the particular level of goal used) was clearly distinguished from that of self-monitoring without goal-setting. Self-monitoring with a goal resulted in a greater weight loss than self-monitoring without a goal over a 4-week period. Caloric intake monitoring (either with or without goal-setting) was primarily associated with a linear trend. When restraint was used as the unit of monitoring, the effects of self-monitoring combined with a goal were not clearly separated from those of self-monitoring combined with no goal. On the one hand, in the pilot experiment, restraint monitoring combined with a goal (either explicit or implicit) differed in effect from restraint monitoring combined with no goal, the former producing more weight loss than the latter. This difference in weight loss, however, showed up only at the very end of the 4-week monitoring period and was not present during the entire period. Restraint monitoring

combined with a goal (either explicit or implicit) was associated with no definite trend and restraint monitoring combined with no goal was associated with linear and quadratic trends. On the other hand, in Experiment 2, the effectiveness of restraint monitoring with goal-setting (irrespective of the particular level of goal utilized) was not different from that of restraint monitoring without goal-setting, the former generating approximately the same amount of weight loss as the latter over 4 weeks of self-monitoring. Restraint monitoring with goal-setting was also associated with the same trends (linear, quadratic, and cubic) as restraint monitoring without goal-setting.

On the basis of Kanfer's self-regulation model, one would expect a difference in effect between self-monitoring combined with a goal and self-monitoring combined with no goal. Such a difference would be expected whether restraint or caloric intake serves as the monitoring unit. A consideration of two possible problems relative to restraint as a unit of monitoring may help in understanding why this expectation is not always consistently met in the case of this unit. The first problem refers to the variation in the energy value of a restraint. Even though a restraint can be easily and reliably identified (as can a calorie), the energy value of a restraint varies greatly from instance to instance within a subject (e.g., a subject restrains himself/herself from a piece of bread at breakfast and from a hamburger at lunch time). There is also variation in the energy value of a restraint from individual to individual (e.g., one subject restrains himself/herself from a piece of pie and another subject restrains himself/herself from a soda cracker). Due to this large variation in the energy value of a

restraint, restraint monitoring does not provide the subject with precise feedback on his/her current eating behavior. Even if the individual knows that he/she has practiced restraint seven times during the day, he/she still does not know what these seven restraints represent in relation to the total energy value of the food ingested to that point during the day or to the total energy value of the food ingested that day. From this viewpoint, a goal formulated in terms of number of restraints to exercise each day leaves much to be desired for guiding and controlling eating behavior. The second problem is that with the subject focusing on instances of restraint, the total energy intake for the day is free to vary. A danger is that this total intake may in fact stay constant with the subject "consciously" or "unconsciously" adding on urges to eat that would not normally have been present. These urges are then not carried through and are therefore counted as instances of restraint. With these two problems, it is not surprising that there is no consistent effect for goal-setting in groups where the goal is set in terms of restraints (pilot experiment and Experiment 2).

The situation is quite different when caloric intake is the unit of monitoring. With the aid of the calorie counting booklet supplied to the subject, the calculated value of a given quantity of food is likely to be very close to the real energy value of the food. A subject's calculated ingestion of X calories for one intake will be very close in real energy value to that subject's calculated ingestion of X calories for some other intake. Similarly, one person's calculated ingestion of X calories will be very close in real energy value to another person's

calculated ingestion of X calories. Hence, caloric intake monitoring can provide precise information on the energy value of what is ingested and can give the subject valuable feedback on his/her current eating behavior. In these conditions, a goal formulated in terms of limitation on caloric intake can readily help to guide and control eating behavior. An additional characteristic of caloric intake monitoring is that it does not leave the total energy intake for the day free to vary. Unlike the situation where goals are set in terms of restraints, goals set in terms of caloric intake would therefore be expected to result in a clear differentiation between subjects who are assigned a definite goal to guide their eating behavior as compared to subjects who are not (Experiment 1).

The above comments on the relative effectiveness of restraint and caloric intake monitoring (as a function of goal-setting) are similar to those made by Romanczyk et al. (1973). They found that caloric intake monitoring was more effective for weight control than daily weight monitoring and attributed the success with the former and the failure with the latter to "the specificity of the information yielded" and to the "definite criterion (provided by caloric intake monitoring) against which performance might be judged" (Romanczyk et al., 1973, p. 635). These comments are also consistent with the evidence suggesting that information feedback is an important component of self-monitoring that may contribute to its effectiveness (Kazdin, 1974b; Richards et al., 1976; Wade, 1974). Within the self-monitoring context, information feedback refers to the information a subject receives as to how well

he/she is doing by observing the record of his/her self-monitoring data.

One suggestion for correcting the problem of variation in energy value associated with restraint monitoring would be to assign to this condition some value in terms of calories. Thus, rather than simply asking subjects to record their daily restraints (and giving them a goal in terms of number of restraints to exercise each day), one could require them to monitor the caloric content of each restraint (and provide them with a goal in terms of the caloric value of each restraint or in terms of the total daily caloric value of the day's restraints). This might be labeled caloric restraint monitoring. By translating any decrease in food ingestion into a definite reduction in energy value, caloric restraint monitoring would give subjects more precise feedback on their restraint behavior and might result in greater control over their eating behavior. This proposal would not, however, solve the problem of the total daily food intake being free to vary. To the subject caloric restraint monitoring might be less aversive and/or difficult than the usual caloric intake monitoring. Rather than calculating the caloric value of all food ingested, the individual is only required to calculate the caloric value of instances of restraint. The effectiveness of caloric restraint monitoring for weight reduction (either combined with goal-setting or not) as well as its hypothetical advantage over the usual caloric intake monitoring might be worth some attention in future research. In particular it might be interesting to compare caloric restraint monitoring in effectiveness to caloric intake monitoring and to restraint monitoring.

A second plausible explanation for the observed difference in the effects of caloric intake and restraint monitoring as a function of goal-setting might be related to the demands involved in the caloric intake and restraint monitoring procedures. When requested to self-record their daily caloric intake, subjects are asked to introduce changes in their everyday eating behavior only if they are assigned a definite goal in terms of level of intake to aim for. If they are not given a goal, they are not asked to modify their eating behavior in any way. According to Kanfer's theoretical formulation, self-monitoring of caloric intake alone would give rise to some changes via self-evaluation and self-consequation influences. On the other hand, it has been argued and demonstrated that "when no explicit instruction in the use of SR [self-reinforcement] is provided, it cannot be assumed that a client will administer SR contingently" (Bellack, 1976, p. 69). Thus, the demands involved in the caloric intake monitoring procedure would likely elicit either systematic or unsystematic changes in eating behavior depending upon whether or not a goal is provided.

When required to self-monitor instances of restraint, subjects are asked to record something which by its very nature implies a decrease in food intake. One might therefore expect restraint monitoring to set the occasion for rather systematic changes in eating behavior independently of a definite goal in terms of daily number of restraints to exercise being prescribed. In other words, the changes introduced in the eating behavior of subjects who are not assigned a goal are more likely to approximate the changes in eating behavior of subjects who are given a

goal in the case of restraint monitoring than in the case of caloric intake monitoring. According to this argument then, in the case of caloric intake monitoring one would expect a difference between those who are given a goal and those who are not, whereas in the case of restraint monitoring there would be no such difference. The latter expectation, however, may not be consistently met as a result of the two problems discussed earlier relative to restraint monitoring (i.e., the problem of variation in the energy value of a restraint and the problem of the total daily energy intake being free to vary). Consequently, the possibility still exists that restraint monitoring sometimes does yield and sometimes does not yield a difference between subjects who are assigned a goal and those who are not. This possibility would help to understand why no difference was found between restraint monitoring with goal-setting and restraint monitoring without goal-setting in Experiment 2, whereas such a difference showed up at the end of the monitoring period in the pilot experiment.

The second issue, investigated in both Experiment 1 and Experiment 2, was the influence of various goal levels on the effectiveness of self-monitoring for inducing weight loss. The results of the two experiments which manipulated goal level revealed no differential effect of goal level for either caloric intake or restraint monitoring. Caloric intake monitoring combined with either a low, moderate, or high goal generated an equal amount of weight loss over a 4-week period. Similarly, restraint monitoring produced an equal amount of weight loss when combined with three goal levels.

Three different possibilities may account for the present finding of no differential effect of either caloric intake or restraint monitoring as a function of differential goal-setting. From the present data, however, it cannot be determined which one is most likely to explain this absence of differential effect. The first possibility is that the goal level variable has an effect but it was not properly induced (i.e., the manipulation did not have its impact). Subjects' response to goal level manipulation as reported in the postquestionnaire may serve to examine this possibility. Computation of the answers given to the third question of the postquestionnaire (see Appendix K) reveals that in Experiment 1 subjects reported having adopted the goal prescribed in a proportion of 85.7 percent, 92.8 percent, and 84.6 percent in the caloric intake monitoring-low goal group, the caloric intake monitoring-moderate goal group, and the caloric intake monitoring-high goal group respectively. With regard to Experiment 2, 50.0 percent, 76.9 percent, and 41.6 percent of the subjects reported having adopted the goal set in the restraint monitoring-low goal group, the restraint monitoring-moderate goal group, and the restraint monitoring-high goal group respectively. The possibility of no differential response to the experimental manipulation does not receive full support from these data since the reported goal-adoption appear to be lower than desired in some restraint monitoring groups (Experiment 2) only. Given this lower reported goal adoption with restraint monitoring, however, one suggestion for adequate testing of the present possibility in future research would be to develop some means of

making sure that goal level is salient to the subjects (e.g., asking the subjects to repeat to themselves a certain number of times every morning that they have to aim for a certain amount of caloric intake during the day). This might insure that goal level will function as a guide to subjects' behavior.

The second possibility is that the goal level variable has an effect but the range of values selected was too restricted to produce the effect. This second possibility is also plausible since there is some indication that a number of individuals overshot the goal prescribed and that this number tended to be higher in low goal groups and to decrease as one goes to high goal groups. In Experiment 1, for instance, 5 subjects out of 14 in the caloric intake monitoring-low goal group attained a daily goal ranging from 138 to 374 ($\bar{M} = 259.8$) calories less than their daily caloric intake goal. In the caloric intake monitoring-moderate goal group, 5 subjects out of 14 attained a goal ranging from 112 to 549 ($\bar{M} = 310.4$) calories less than their daily caloric intake goal. In the caloric intake monitoring-high goal group, only 2 subjects out of 13 achieved a daily goal higher than the daily caloric intake goal prescribed. Similarly, in Experiment 2, 5 subjects out of 14 in the restraint monitoring-low goal group achieved a daily goal ranging from 1.33 to 7.14 ($\bar{M} = 2.88$) restraints more than their daily restraint goal. In the restraint monitoring-moderate goal group, 3 subjects out of 13 attained a goal ranging from 0.69 to 1.96 ($\bar{M} = 1.15$) restraints more than their daily restraint goal. In the restraint monitoring-high goal group, no subject out of 12 achieved a daily goal higher than the daily restraint goal prescribed. The average figures

(i.e., daily average number of calories or restraints) for each goal level group also suggest that all groups, one the average, were limiting themselves by about the same amount of calories or restraints each day. These figures were obtained by adding the daily number of calories or restraints over 4 weeks for each subject in each group, dividing by the number of subjects in each group, and dividing again by the number of days (28). For Experiment 1, the daily average number of calories was 1378.6, 1346.7, and 1289.7 in the caloric intake monitoring-low goal group, the caloric intake monitoring-moderate goal group, and the caloric intake monitoring-high goal group respectively. For Experiment 2, the daily average number of restraints was 4.78, 6.17, and 6.25 in the restraint monitoring-low goal group, the restraint monitoring-moderate goal group, and the restraint monitoring-high goal group respectively (only the restraint monitoring-low goal group stands out as different). Such data would provide support to the possibility that the particular goal levels used in both Experiment 1 and Experiment 2 did not result in differential behavior by the subjects in the various goal level groups. In view of this, a relevant suggestion for further testing of this second possibility would be to use a greater spread of goal levels. Self-monitoring effectiveness might appear to vary as a function of differential goal-setting to the extent that the levels of goal are more markedly differentiated than those utilized in the present experiments.

The third possibility is that the goal level variable has no effect on the process under study, even though such an effect is implied in the model formulated by Kanfer (1970a). Since the present experiments were the first attempts to investigate this variable, only replication studies

incorporating the above suggestions might confirm this possibility. Should these replication studies lead again to the finding of no differential effect, then the possibility that various goal levels do not differentially influence the effects of self-monitoring would become very likely. Finally, when conducting such replication studies, particular attention should be paid to examining what subjects report doing when they attain a goal as compared to when they do not (e.g., by using a postquestionnaire). Kanfer's model postulates that self-monitoring leads to self-evaluation which itself leads to self-consequence (either self-reinforcement or self-punishment). As indicated in the introduction chapter, many questions concerning this self-consequence operation are unanswered (e.g., the magnitude of the self-reinforcers and/or self-punishers delivered, the schedule of delivery, the consistency of delivery, etc.).

The third issue of interest was that of the use of implicit as compared to explicit goal-setting in combination with self-monitoring. The pilot experiment revealed no significant difference in effect between self-monitoring combined with an implicit goal and self-monitoring combined with an explicit goal. The restraint monitoring-implicit goal group generated the same amount of weight loss as the restraint monitoring-explicit goal group over 4 weeks of self-monitoring. Since the present finding of no difference between the use of implicit and explicit goals with self-monitoring is based upon two groups that monitored restraints, it must be considered with caution. In view of the previous argument relative to the demands involved in the restraint monitoring procedure,

one might expect restraint monitoring combined with either no goal or an implicit goal or an explicit goal to show similar decreases. What would happen with the use of implicit as compared to explicit goal-setting in combination with caloric intake monitoring might be quite different. In other respects, this finding appears as interesting because of its potential use in therapy situations. As suggested before, it is possible that to the subject self-monitoring combined with implicit goal-setting is relatively effortless, although there are changes in the desired direction. The subject may then be in a good "headspace" for additional treatment intended to produce further desirable changes. This potential use as well as the limits imposed upon the present finding call for a replication study. It would be advisable in such a replication study to incorporate the use of implicit versus explicit goals in combination with the self-monitoring of units that do not involve the inherent demands entailed in the self-monitoring of restraints (e. g., caloric intake, food intake, eating habits).

The fourth and last issue which guided this research was that of the effectiveness of self-monitoring for inducing weight loss as a function of different monitoring units (i.e., caloric intake and restraint). The pilot experiment made a direct comparison of restraint monitoring with caloric intake monitoring. The results indicated no difference between the two. Restraint monitoring (combined with either an explicit or implicit goal) produced the same amount of weight loss over a 4-week period as caloric intake monitoring (combined with an explicit goal).

Data relevant to this fourth issue are also available in an informal comparison of Experiment 1 with Experiment 2. An examination of Figure 2 and Figure 3 reveals that overall, for the goal levels adopted, the caloric intake monitoring groups (Experiment 1) lost more weight than the restraint monitoring groups (Experiment 2). On the basis of the evidence from these two experiments, one cannot say much about this difference in the magnitude of weight loss as caloric intake monitoring and restraint monitoring were kept separate at the level of designs as well as statistical analyses. It is suggested, however, that a plausible source of weight loss difference favoring a greater weight loss for the caloric intake monitoring groups is to be found in a lack of equivalence between the various goal levels for the caloric intake monitoring groups and the various goal levels for the restraint monitoring groups used in Experiment 1 and Experiment 2 respectively.

Following the pilot experiment, efforts were made to establish an equivalence between caloric intake and restraints by referring to the amount of weight loss (i.e., analysing the daily average number of restraints for subjects having lost on the average approximately 1 or 2 pounds per week). On the basis of this analysis, the values were set for Experiment 2. Low goal was four restraints, moderate goal was seven restraints, and high goal was 10 restraints. Following Experiment 2, another way of establishing such an equivalence was developed. This consisted of assessing the caloric value of a restraint for each subject (by multiplying the number of pounds lost by 3500 calories and dividing by the cumulative number of restraints). Then, for all subjects, the

average caloric value of a restraint was determined (by adding the caloric value of a restraint for each subject and dividing by the number of subjects). This calculation performed for all subjects involved in Experiment 2 (irrespective of the particular group they belonged to) reveals that the average caloric value of a restraint for these subjects was 79.5 calories. A similar calculation performed for all restraint monitoring subjects involved in the pilot experiment shows that the average caloric value of a restraint for these subjects was 73.7 calories. These calculations suggest that a restraint is equivalent to approximately 75 calories and that, accordingly, an average weight loss of 1.0, 1.5, and 2.0 pounds per week would require 6.6, 10, and 13.3 restraints per day respectively. In Experiment 2, subjects in the low, moderate, and high goal groups were required to exercise 4, 7, and 10 restraints per day respectively. In terms of the new equivalence these figures are too low and represent an average weight loss of only 0.5, 1.0, and 1.5 rather than 1.0, 1.5, and 2.0 pounds per week as originally intended. So, the apparent greater weight loss by the caloric intake monitoring groups in Experiment 1 might well be due to the fact that the goals set for these groups are higher than the goals set for the restraint monitoring groups in Experiment 2. It should be added that, according to the new figures, caloric intake and restraint monitoring as used in the pilot experiment might be thought of as being relatively equivalent (hence, the lack of difference in the effect of the two monitoring units in the pilot experiment). In view of this, the informal comparison of Experiment 1 with Experiment 2

appears as a nonlegitimate ground for assessing the relative effectiveness of restraint and caloric intake monitoring. (Any formal comparison of the relative effectiveness of restraint and caloric intake monitoring must deal with the problem of the equivalence of goal levels set, and the present studies have not successfully dealt with this problem). The direct comparison made in the pilot experiment is a much more legitimate comparison and suggests that restraint monitoring is as effective as caloric intake monitoring for inducing weight loss.

The observed differences in the trend or pattern of weight loss effects associated with caloric intake and restraint monitoring over time deserve some attention. The trend associated with caloric intake monitoring was somewhat alike from experiment to experiment. In the pilot experiment, the caloric intake monitoring group (explicit goal) was associated with a significant linear trend. Similarly, in Experiment 1, all caloric intake monitoring groups were primarily associated with a linear trend. By contrast, the trend associated with restraint monitoring differed from experiment to experiment. In the pilot experiment, the only restraint monitoring group associated with definite significant trends (linear and quadratic) was the restraint monitoring-no goal group. In Experiment 2, however, all restraint monitoring groups appeared to be associated with linear, quadratic, and cubic trends. Overall it would seem that caloric intake monitoring generated relatively constant weight loss effects as compared to restraint monitoring which produced much more varying effects both across the monitoring period and across experiments. This, in itself, would suggest that something different is going on in restraint

monitoring as compared to caloric intake monitoring.

Further investigation is needed before any conclusive statement can be made regarding the relative efficacy of restraint and caloric intake monitoring for inducing weight loss. This investigation should include formal comparisons of restraint monitoring with caloric intake monitoring equated in some way (e.g., by using caloric restraint monitoring) as well as comparisons of restraint monitoring with other relevant units (e.g., eating habits, food intake). Within the self-monitoring of restraint itself, comparisons should be made of prerestraint and postrestraint monitoring. On the basis of Kanfer's model, restraint monitoring appears as a particularly appropriate arrangement for modifying eating. On the other hand, the use of prerestraint monitoring (i.e., monitoring of intended restraint) might contribute to increase the efficacy of restraint as a unit of monitoring as compared to postrestraint monitoring (i.e., monitoring of what is not eaten). Bellack, Rozensky, and Schwartz (1974), who found preeating monitoring of food intake to be more effective than posteating monitoring of food intake for producing weight loss, argued that the former would have the effect of introducing new discriminative stimuli which direct the behavior of eating along another chain, whereas the latter would not. With regard to self-monitoring of restraints, prerestraint monitoring might serve as a cue for focusing on the intended restraint behavior and insuring its implementation, whereas postrestraint monitoring might not. In this perspective, prerestraint monitoring might appear to be associated with greater effects than restraint monitoring as used in the present experiments (which was equivalent to postrestraint

monitoring).

Even though the major focus of the present experiments was not on self-monitoring alone as a complete treatment strategy for weight reduction, a few additional comments on the usefulness of self-monitoring for inducing weight loss seem appropriate. First it is noteworthy that on the average all self-monitoring groups involved in the three experiments (irrespective of the unit monitored, the use of goals versus no goal, and the use of various goal levels) lost weight. The raw weight loss at the end of Week 4 ranged from 0.46 to 5.79 pounds ($\bar{M} = 3.30$ pounds). This represents an average weekly weight loss ranging from 0.11 to 1.44 pound ($\bar{M} = 0.82$ pound). In addition, most subjects (within groups) achieved some measure of weight reduction. Of the 155 subjects involved in all experiments, 129 or 83.2 percent lost weight. Although the desired no-treatment comparison groups are not present, these data are not inconsistent with the literature indicating that self-monitoring is effective in producing weight loss in obese individuals (Bellack, Rozensky, & Schwartz, 1974; Bellack, Schwartz, & Rozensky, 1974; Romanczyk, 1974; Romanczyk et al., 1973; Rozensky & Bellack, 1976). On the other hand, it must be pointed out that the weight loss effects of self-monitoring seem to level off relatively early in time. The results of Experiment 1 and Experiment 2 provide some indication that self-monitoring (either combined with goal-setting or not) might produce its optimal effects within a 3-week period. The greatest weight loss occurred at Week 3 in both experiments. These results are consistent with the finding that self-monitoring is effective when it is first implemented but that the effect decreases over time

(Mahoney, 1974a; Rekers & Varni, 1977b). These results may also have practical implications for the use of self-monitoring as a method for weight reduction. They suggest that relying on self-monitoring as a unique treatment strategy for weight reduction, as hinted at by Romanczyk et al. (1973), might not be all that successful. Utilizing self-monitoring as the early part of a more comprehensive weight control program might be more appropriate. In the latter case, 3 weeks of self-monitoring might be planned after which additional procedures for weight reduction would be introduced. Again, this suggestion is derived from the former idea that initial weight loss produced through self-monitoring with very little effort by the subject might facilitate the implementation of further treatment procedures.

Finally, a variety of data were collected through questionnaires in an effort directed toward isolating factors that might relate to weight loss. None of the factors contained in the prequestionnaire of both Experiment 1 and Experiment 2 correlated significantly with weight reduction at the end of the self-monitoring period. This finding fits with previous unsuccessful attempts to disclose variables predictive of weight loss. The numerous variables previously examined included demographic, personality, and individual weight history variables (for a review, see Abramson, 1973, 1977; Hall & Hall, 1974; Rozensky & Bellack, 1976). To these can be added motivation to lose weight, pretreatment goal, and family context as examined in the present studies.

Among the factors contained in the postquestionnaire, only the Daily

goal factor appeared to be associated with weight loss when caloric intake served as the unit of monitoring but not when restraint was utilized as the recording unit. This finding is consistent with the overall results of both Experiment 1 and Experiment 2 since in the former goal-setting was shown to enhance caloric intake monitoring effectiveness and in the latter it did not appear to augment restraint monitoring effectiveness. This finding may also have implications for any weight reduction enterprise involving the self-monitoring technique or any other method. Perhaps the most important of these would be to encourage and foster goal-setting. However, any encouragement or instructions in goal-setting should convey the set that the safest way to master ultimate goals is to pursue realistic daily goals. This would appear especially appropriate since it has been observed that individuals often enter weight reduction programs expecting rapid and drastic changes in weight (Mahoney, 1974a).

In summarizing the results of the present experiments with respect to each of the four issues, one must first admit that it is unclear whether or not goal-setting enhances the effects of self-monitoring. Nevertheless, some interesting speculations about restraint as a monitoring unit were raised in considering this issue. To the question of whether various goal levels influence differentially self-monitoring effectiveness, no difference has been found in both experiments (Experiment 1 and Experiment 2) investigating this issue. It is speculated that either the goal level variable has no effect, it was improperly induced, or the values selected were too restricted to produce differential effects. Self-monitoring combined

with implicit goal-setting appears to be as effective as self-monitoring combined with explicit goal-setting. However, caution is required since this conclusion is based on a comparison using self-monitoring of restraints only. Due to the issues discussed relative to restraint monitoring, the conclusion may not be applicable to caloric intake monitoring. Finally, even though there is some minimal evidence for the equal effectiveness of the self-monitoring of caloric intake and restraints from the pilot experiment, it is not clear which unit is most effective in producing weight loss as a result of the lack of formal comparison and goal level equivalence. Both problems may be partially resolved by resorting to caloric restraint monitoring.

REFERENCES

- Abramson, E. E. A review of behavioral approaches to weight control. Behaviour Research and Therapy, 1973, 11, 547-556.
- Abramson, E. E. Behavioral approaches to weight control: An updated review. Behaviour Research and Therapy, 1977, 15, 355-363.
- Armentrout, D. P. The effects of self-monitoring on a tension induced pain syndrome. Dissertation Abstracts International, 1973, 34(3-B), 1268. (Abstract)
- Ayllon, T., & Azrin, N. H. Reinforcer sampling: A technique for increasing the behavior of mental patients. Journal of Applied Behavior Analysis, 1968, 1, 13-20.
- Azrin, N. H., & Powell, J. Behavioral engineering: The use of response priming to improve prescribed self-medication. Journal of Applied Behavior Analysis, 1969, 2, 39-42.
- Bandura, A. Principles of behavior modification. New York: Holt, Rinehart & Winston, 1969.
- Bellack, A. S. Behavior therapy for weight reduction. Addictive Behaviors, 1975, 1, 73-82.
- Bellack, A. S. A comparison of self-reinforcement and self-monitoring in a weight reduction program. Behavior Therapy, 1976, 7, 68-75.
- Bellack, A. S., & Rozensky, R. H. The selection of dependent variables for weight reduction studies. Journal of Behavior Therapy and Experimental Psychiatry, 1975, 6, 83-84.
- Bellack, A. S., Rozensky, R. H., & Schwartz, J. A comparison of two forms of self-monitoring in a behavioral weight reduction program. Behavior Therapy, 1974, 5, 523-530.
- Bellack, A. S., Schwartz, J., & Rozensky, R. H. The contribution of external control to self-control in a weight reduction program. Journal of Behavior Therapy and Experimental Psychiatry, 1974, 5, 245-249.
- Berecz, J. Modification of smoking behavior through self-administered punishment of imagined behavior: A new approach to aversion therapy. Journal of Consulting and Clinical Psychology, 1972, 38, 244-250.

- Biglan, A., & Kass, D. J. The empirical nature of behavior therapies. Behaviorism, 1977, 5, 1-15.
- Bolstad, O. D., & Johnson, S. M. Self-regulation in the modification of disruptive classroom behavior. Journal of Applied Behavior Analysis, 1972, 5, 443-454.
- Borkovec, T. D. Effects of expectancy on the outcome of systematic desensitization and implosive treatments for analogue anxiety. Behavior Therapy, 1972, 3, 29-40.
- Bray, G. A. Clinical management of the obese adult. Postgraduate Medicine, 1972, 51, 125-130.
- Brightwell, D. R., & Sloan, C. L. Long-term results of behavior therapy for obesity. Behavior Therapy, 1977, 8, 898-905.
- Broden, M., Hall, R. V., & Mitts, B. The effect of self-recording on the classroom behavior of two eight-grade students. Journal of Applied Behavior Analysis, 1971, 4, 191-199.
- Carnahan, J. E. The effects of self-monitoring by patients on the control of hypertension. Dissertation Abstracts International, 1973, 34(6-B), 2922. (Abstract)
- Cavior, N., & Marabotto, C. M. Monitoring verbal behaviors in a dyadic interaction. Journal of Consulting and Clinical Psychology, 1976, 44, 68-76.
- Drabman, R. S., Spitalnik, R., & O'Leary, K. D. Teaching self-control to disruptive children. Journal of Abnormal Psychology, 1973, 82, 10-16.
- Epstein, L. H., Miller, P. M., & Webster, J. S. The effects of reinforcing concurrent behavior on self-monitoring. Behavior Therapy, 1976, 7, 89-95.
- Epstein, L. H., Webster, J. S., & Miller, P. M. Accuracy and controlling effects of self-monitoring as a function of concurrent responding and reinforcement. Behavior Therapy, 1975, 6, 654-666.
- Ernst, F. Self-recording and counterconditioning of a self-mutilative compulsion. Behavior Therapy, 1973, 4, 144-146.
- Eysenck, H. J. Behavior therapy and the neuroses. New York: Pergamon Press, 1960.
- Eysenck, H. J. Experiments in behavior therapy. New York: Pergamon Press, 1964.

- Fixsen, D. L., Phillips, E. L., & Wolf, M. M. Achievement place: The reliability of self-reporting and peer-reporting and their effects on behavior. Journal of Applied Behavior Analysis, 1972, 5, 19-30.
- Frederiksen, L. W., Epstein, L. H., & Kosevsky, B. P. Reliability and controlling effects of three procedures for self-monitoring smoking. The Psychological Record, 1975, 25, 255-264.
- Glynn, E. L. & Thomas, J. D. Effects of cueing on self-control of classroom behavior. Journal of Applied Behavior Analysis, 1974, 7, 299-306.
- Glynn, E. L., Thomas, J. D., & Shee, S. M. Behavioral self-control of on-task behavior in an elementary classroom. Journal of Applied Behavior Analysis, 1973, 6, 105-113.
- Gottman, J. M., & McFall, R. M. Self-monitoring effects in a program for potential high school dropouts: A time-series analysis. Journal of Consulting and Clinical Psychology, 1972, 39, 273-281.
- Greiner, J.M., & Karoly, P. Effects of self-control training on study activity and academic performance: An analysis of self-monitoring, self-reward, and systematic-planning components. Journal of Counseling Psychology, 1976, 23, 495-502.
- Hall, S. M. Self-control and therapist control in the behavioral treatment of overweight women. Behaviour Research and Therapy, 1972, 10, 59-68.
- Hall, S. M., & Hall, R. G. Outcome and methodological considerations in behavioral treatment of obesity. Behavior Therapy, 1974, 5, 352-364.
- Hall, S. M., Hall, R. G., Borden, B. L., & Hanson, R. W. Follow-up strategies in the behavioral treatment of overweight. Behaviour Research and Therapy, 1975, 13, 167-172.
- Harris, M. B., & Hallbauer, E. S. Self-directed weight control through eating and exercise. Behaviour Research and Therapy, 1973, 11, 523-529.
- Hartig, M., & Kanfer, F. H. The role of verbal self-instructions in children's resistance to temptation. Journal of Personality and Social Psychology, 1973, 25, 259-267.
- Herbert, E. W., & Baer, D. M. Training parents as behavior modifiers: Self-recording of contingent attention. Journal of Applied Behavior Analysis, 1972, 5, 139-149.
- Homme, L. E. Perspectives in psychology: XXIV. Control of coverants, the operants of the mind. The Psychological Record, 1965, 15, 501-511.

- Hoon, P. W. Effects of self-monitoring and self-recording on ecological acts. Psychological Reports, 1976, 38, 1285-1286.
- Horan, J. J., Hoffman, A. M., & Macri, M. Self-control of chronic fingernail biting. Journal of Behavior Therapy and Experimental Psychiatry, 1974, 5, 307-309.
- Jason, L. Rapid improvement in insomnia following self-monitoring. Journal of Behavior Therapy and Experimental Psychiatry, 1975, 6, 349-350.
- Jason, L. A. Self-monitoring in the treatment of nose squeezing and daydreaming. Psychological Reports, 1976, 38, 235-238.
- Johnson, S. M., & White, G. Self-observation as an agent of behavioral change. Behavior Therapy, 1971, 2, 488-497.
- Kanfer, F. H. Self-monitoring: Methodological limitations and clinical applications. Journal of Consulting and Clinical Psychology, 1970, 35, 148-152. (a)
- Kanfer, F. H. Self-regulation: Research, issues, and speculations. In C. Neuringer & J. L. Michael (Eds.), Behavior modification in clinical psychology. New York: Appleton-Century-Crofts, 1970. (b)
- Kanfer, F. H. The maintenance of behavior by self-generated stimuli and reinforcement. In A. Jacobs & L. B. Sachs (Eds.), The psychology of private events: Perspectives on covert response systems. New York: Academic Press, 1971.
- Kanfer, F. H., & Karoly, P. Self-control: A behavioristic excursion into the lion's den. Behavior Therapy, 1972, 3, 398-416.
- Kanfer, F. H., & Phillips, J. S. Learning foundations of behavior therapy. New York: Wiley, 1970.
- Karoly, P., & Doyle, W. W. Effects of outcome expectancy and timing of self-monitoring on cigarette smoking. Journal of Clinical Psychology, 1975, 31, 351-355.
- Katz, R. C., Thomas, S. L., & Williamson, P. Effects of self-monitoring as a function of its expected benefits and incompatible response training. The Psychological Record, 1976, 26, 533-540.
- Kaufman, K. F., & O'Leary, K. D. Reward, cost, and self-evaluation procedures for disruptive adolescents in a psychiatric hospital school. Journal of Applied Behavior Analysis, 1972, 5, 293-309.

- Kazdin, A. E. Self-monitoring and behavior change. In M. J. Mahoney & C. E. Thoresen, Self-control: Power to the person. Monterey, Calif.: Brooks Cole, 1974. (a)
- Kazdin, A. E. Reactive self-monitoring: The effects of response desirability, goal setting, and feedback. Journal of Consulting and Clinical Psychology, 1974, 42, 704-716. (b)
- Kazlo, M. R. The effects of self-monitoring on the frequency of aspects of study behavior. Dissertation Abstracts International, 1976, 36(10-A), 6476. (Abstract)
- Kolb, D. A., Winter, S. K., & Berlew, D. E. Self-directed change: Two studies. Journal of Applied Behavior Science, 1968, 4, 453-471.
- Kunzelmann, H. D. (Ed.). Precision teaching. Seattle, Wa.: Special Child Publications, 1970.
- Layne, C. C., Rickard, H. C., Jones, M. T., & Lyman, R. D. Accuracy of self-monitoring on a variable ratio schedule of observer verification. Behavior Therapy, 1976, 7, 481-488.
- Leitenberg, H., Agras, W. S., Thompson, L. D., & Wright, D. E. Feedback in behavior modification: An experimental analysis in two phobic cases. Journal of Applied Behavior Analysis, 1968, 1, 131-137.
- Leon, G. R. Treatment of obesity: A behavior modification approach. Minnesota Medicine, 1974, 57, 977-980.
- Leon, G. R. Current directions in the treatment of obesity. Psychological Bulletin, 1976, 83, 557-578.
- Levitz, L. S., & Jordan, H. A. Manual for the analysis of energy intake and expenditure. In G. A. Bray (Ed.), Obesity in perspective. Washington: DHEW Publication No. (NIH) 75-708, 1975.
- Lipinski, D. P., Black, J. L., Nelson, R. O., & Ciminero, A. R. Influence of motivational variables on the reactivity and reliability of self-recording. Journal of Consulting and Clinical Psychology, 1975, 43, 637-646.
- Lipinski, D. P., & Nelson, R. O. The reactivity and unreliability of self-recording. Journal of Consulting and Clinical Psychology, 1974, 42, 118-123.
- Lyman, R. D., Rickard, H. C., & Elder, I. R. Contingency management of self-report and cleaning behavior. Journal of Abnormal Child Psychology, 1975, 3, 155-162.

- Mahoney, M. J. Toward an experimental analysis of coverant control. Behavior Therapy, 1970, 1, 510-521.
- Mahoney, M. J. Self-reward and self-monitoring techniques for weight control. Behavior Therapy, 1974, 5, 48-57. (a)
- Mahoney, M. J. Cognition and behavior modification. Cambridge, Mass.: Ballinger, 1974. (b)
- Mahoney, M. J., Moore, B. S., Wade, T. C., & Moura, N. G. M. Effects of continuous and intermittent self-monitoring on academic behavior. Journal of Consulting and Clinical Psychology, 1973, 41, 65-69.
- Mahoney, M. J., Moura, N. G. M., & Wade, T. C. Relative efficacy of self-reward, self-punishment, and self-monitoring techniques for weight loss. Journal of Consulting and Clinical Psychology, 1973, 40, 404-407.
- Maletzky, B. M. Behavior recording as treatment: A brief note. Behavior Therapy, 1974, 5, 107-111.
- McFall, R. M. Effects of self-monitoring on normal smoking behavior. Journal of Consulting and Clinical Psychology, 1970, 35, 135-142.
- McFall, R. M., & Hammen, C. L. Motivation, structure, and self-monitoring: Role of nonspecific factors in smoking reduction. Journal of Consulting and Clinical Psychology, 1971, 37, 80-86.
- Mckenzie, T. L., & Rushall, B. S. Effects of self-recording on attendance and performance in a competitive swimming training environment. Journal of Applied Behavior Analysis, 1974, 7, 199-206.
- McNamara, J. R. The use of self-monitoring techniques to treat nailbiting. Behaviour Research and Therapy, 1972, 10, 193-194.
- Nelson, R. O. Methodological issues in assessment via self-monitoring. In J. D. Cone & R. P. Hawkins (Eds.), Behavioral assessment: New directions in clinical psychology. New York: Brunner/Mazel, 1977.
- Nelson, R. O., Lipinski, D. P., & Black, J. L. The effects of expectancy on the reactivity of self-recording. Behavior Therapy, 1975, 6, 337-349.
- Nelson, R. O., Lipinski, D. P., & Black, J. L. The relative reactivity of external observations and self-monitoring. Behavior Therapy, 1976, 7, 314-321. (a)
- Nelson, R. O., Lipinski, D. P., & Black, J. L. The reactivity of adult retardates' self-monitoring: A comparison among behaviors of different valences, and a comparison with token reinforcement. The Psychological Record, 1976, 26, 189-201. (b)

- Ober, D. C. The modification of smoking behavior. Journal of Consulting and Clinical Psychology, 1968, 32, 543-549.
- O'Brien, F., Azrin, N. H., & Henson, K. Increased communications of chronic mental patients by reinforcement and by response priming. Journal of Applied Behavior Analysis, 1969, 2, 23-29.
- Oliveau, D. C., Agras, W. S., Leitenberg, H., Moore, R. C., & Wright, D. E. Systematic desensitization, therapeutically oriented instructions and selective positive reinforcement. Behaviour Research and Therapy, 1969, 7, 27-33.
- Olson, K. A. An experimental analysis of self-reinforcement and two approaches to modifying study behavior: self-monitoring and self-modeling. Dissertation Abstracts International, 1975, 35(7-B), 3591-3592. (Abstract)
- Powell, J., & Azrin, N. The effects of shock as a punisher for cigarette smoking. Journal of Applied Behavior Analysis, 1968, 1, 63-71.
- Rehm, L. P., & Marston, A. R. Reduction of social anxiety through modification of self-reinforcement: An instigation therapy technique. Journal of Consulting and Clinical Psychology, 1968, 32, 565-574.
- Rekers, G. A., & Varni, J. W. Self-monitoring and self-reinforcement processes in a pre-transsexual boy. Behaviour Research and Therapy, 1977, 15, 177-180. (a)
- Rekers, G. A., & Varni, J. W. Self-regulation of gender-role behaviors: A case study. Journal of Behavior Therapy and Experimental Psychiatry, 1977, 8, 427-432. (b)
- Richards, C. S. Behavior modification of studying through study skills advice and self-control procedures. Journal of Counseling Psychology, 1975, 22, 431-436.
- Richards, C. S., McReynolds, W. T., Holt, S., & Sexton, T. Effects of information feedback and self-administered consequences on self-monitoring study behavior. Journal of Counseling Psychology, 1976, 23, 316-321.
- Risley, T. R., & Hart, B. Developing correspondence between the non-verbal and verbal behavior of preschool children. Journal of Applied Behavior Analysis, 1968, 1, 267-281.
- Romanczyk, R. G. Self-monitoring in the treatment of obesity: Parameters of reactivity. Behavior Therapy, 1974, 5, 531-540.

- Romanczyk, R. G., Tracey, D. A., Wilson, G. T., & Thorpe, G. I. Behavioral techniques in the treatment of obesity. Behaviour Research and Therapy, 1973, 11, 629-640.
- Rozensky, R. H. The effect of timing of self-monitoring behavior on reducing cigarette consumption. Journal of Behavior Therapy and Experimental Psychiatry, 1974, 5, 301-303.
- Rozensky, R. H., & Bellack, A. S. Individual differences in self-reinforcement style and performance in self- and therapist-controlled weight reduction programs. Behaviour Research and Therapy, 1976, 14, 357-364.
- Rutner, I. T. The modification of smoking behavior through techniques of self-control. Unpublished master's thesis, Wichita State University, 1967.
- Rutner, I. T., & Bugle, C. An experimental procedure for the modification of psychotic behavior. Journal of Consulting and Clinical Psychology, 1969, 33, 651-653.
- Seymour, F. W., & Stokes, T. F. Self-recording in training girls to increase work and evoke staff praise in an institution for offenders. Journal of Applied Behavior Analysis, 1976, 9, 41-54.
- Sidman, M. Tactics of scientific research. New York: Basic Books, 1960.
- Sieck, W. A., & McFall, R. M. Some determinants of self-monitoring effects. Journal of Consulting and Clinical Psychology, 1976, 44, 958-965.
- Simkins, L. The reliability of self-recorded behaviors. Behavior Therapy, 1971, 2, 83-87.
- Skinner, B. F. Science and human behavior. New York: Macmillan, 1953.
- Skinner, B. F. Behaviorism at fifty. Science, 1963, 140, 951-958.
- Sobell, L. C., & Sobell, M. B. A self-feedback technique to monitor drinking behavior in alcoholics. Behaviour Research and Therapy, 1973, 11, 237-238.
- Spates, C. R., & Kanfer, F. H. Self-monitoring, self-evaluation, and self-reinforcement in children's learning: A test of a multistage self-regulation model. Behavior Therapy, 1977, 8, 9-16.

- Stollack, G. E. Weight loss obtained under different experimental procedures. Psychotherapy: Theory, Research and Practice, 1967, 4, 61-64.
- Stuart, R. B. A three-dimensional program for the treatment of obesity. Behaviour Research and Therapy, 1971, 9, 177-186.
- Stuart, R. B. Behavioral control of overeating: A status report. In G. A. Bray (Ed.), Obesity in perspective. Washington: DHEW Publication No. (NIH) 75-708, 1975.
- Stunkard, A. New therapies for the eating disorders: Behavior modification of obesity and anorexia nervosa. Archives of General Psychiatry, 1972, 26, 391-398.
- Stunkard, A. J., & Mahoney, M. J. Behavioral treatment of the eating disorders. In H. Leitenberg (Ed.), Handbook of behavior modification. New York: Prentice-Hall, 1976.
- Thomas, J. D. Accuracy of self-assessment of on-task behavior by elementary school children. Journal of Applied Behavior Analysis, 1976, 9, 209-210.
- Thomas, E. J., Abrams, K. S., & Johnson, J. B. Self-monitoring and reciprocal inhibition in the modification of multiple tics of Gilles de la Tourette's syndrome. Journal of Behavior Therapy and Experimental Psychiatry, 1971, 2, 159-171.
- Thoresen, C. E., & Mahoney, M. J. Behavioral self-control. New York: Holt, Rinehart & Winston, 1974.
- Ullman, L. P. On cognitions and behavior therapy. Behavior Therapy, 1970, 1, 201-204.
- Wade, T. C. Relative effects on performance and motivation of self-monitoring correct and incorrect responses. Journal of Experimental Psychology, 1974, 103, 245-248.
- Watson, J. B. Behaviorism. Chicago: University of Chicago Press, 1924.
- Williams, J. E. Self-monitoring of paranoid behavior. Behavior Therapy, 1976, 7, 562.
- Wollersheim, J. P. Effectiveness of group therapy based upon learning principles in the treatment of overweight women. Journal of Abnormal Psychology, 1970, 76, 462-474.
- Wolpe, J. Psychotherapy by reciprocal inhibition. Stanford: Stanford University Press, 1958.

APPENDIX A

ADVERTISEMENT FOR PILOT EXPERIMENT

Men and women are invited to participate in a research project designed for weight control and supervised by a professor of the Faculty of psychology of the University of Ottawa. To be eligible, you have to meet the following criteria: (a) a minimum age of 18 years and a maximum of 45 years, (b) a minimum of 10 percent overweight, (c) nonpregnant status, (d) no surgery in the preceding 2 months, and (e) under no past or present physician's care for a weight related disorder (e.g., hormonal or metabolic disorder).

For more information call at 235-7116 between 4.00 and 7.00 p.m. from monday to friday.

APPENDIX B

PREQUESTIONNAIRE FOR PILOT EXPERIMENT

No one but the person in charge of the present program will have access to this information. This information is collected only for research purposes and is otherwise confidential.

1. Name _____ 2. Age _____ 3. Sex _____
4. Marital status (S M Sep D W) _____ 5. Phone number _____
6. Occupation _____ 7. Education _____
8. Which would you call yourself? (check which applies)
Normal weight ____ Slightly overweight ____ Very overweight _____
9. How much weight would you like to lose? _____ pounds
10. What is the heaviest you have ever been and at what age?
Weight _____ Age _____
11. What is the lightest you have ever been and at what age?
Weight _____ Age _____
12. During which periods have you been overweight? (check all which apply)
Never _____ Always _____ Birth _____ Baby _____
As a child (before age 6) _____ As a child (before age 13) _____
As an adolescent (ages 13-19) _____
Age 20-29 _____ Age 30-39 _____ Age 40+ _____
13. Is anyone in your family overweight? Please give relationship
(e.g., mother, husband, daughter, sister...)

14. Have you ever tried to lose weight? Yes _____ No _____

15. If so, how many times? _____ times
16. How long did you keep trying each time? (average) _____
17. What was the most weight lost? _____
18. How long did you keep your weight down? _____
19. What methods have you used to lose weight? (be as specific as possible)
20. Which were the most successful methods of losing weight?
21. Why do you think you gained weight?

APPENDIX C

FORM OF ADHERENCE OF SUBJECTS TO PILOT EXPERIMENT

I have been invited by an advertisement to participate in a research project designed for weight control and supervised by a professor of the Faculty of psychology of the University of Ottawa. To be eligible I have to meet the following basic criteria: (a) a minimum age of 18 years and a maximum of 45 years, (b) a minimum of 10 percent overweight, (c) non-pregnant status, (d) no surgery in the preceding 2 months, and (e) under no past or present physician's care for a weight related disorder (e.g. hormonal or metabolic disorder). Two additional conditions for participating in the program are: (a) no involvement in any other weight reduction program nor taking diet pills and (b) a \$15.00 deposit (refundable upon attendance to program sessions).

I have met with the person in charge of the program and have been given general information on the nature of the program.

I hereby acknowledge that I am participating in the present research project on a voluntary basis and accept responsibility for my involvement.

Signature: _____

Date: _____

APPENDIX D

CALORIC INTAKE MONITORING PROCEDURE: PILOT EXPERIMENT AND EXPERIMENT 1

First I would like to welcome you to this weight control program in which each of you has shown himself/herself willing to participate. I remind you that the program, as advertised, is part of an ongoing research project.

All of you know that your main purpose in being here is to lose weight. This weight control program has been specifically designed to help you in your efforts to reduce and regulate your weight. We will provide you with information and suggestions for controlling weight. A crucial factor, however, will be yourself: your motivation to see the program through to the end, your willingness to commit yourself to the necessary tasks of the program, and your willingness to work at each aspect and each phase of the program.

Having said that, I would now like to deal with the causes of being overweight. The scientific literature on this topic points to the fact that while from a physiological point of view being overweight may result from multiple causes, it represents in its simplest form an imbalance between caloric intake and caloric expenditure or, to put it in another way, between the calories we take in and the calories we use up. To maintain a constant level of bodyweight the food energy must balance the daily energy requirements of the body. When we consume more calories than are necessary to produce the energy we expend, the excess calories are stored in our body

- chiefly as fat - and we gain weight. As you probably know already, it takes only 3500 calories to build 1 pound of fat.

Certainly being overweight will not develop unless caloric intake exceeds caloric expenditure. Actually, the only characteristic consistently distinguishing the overweight from the nonoverweight individuals has been overeating. In the great majority of cases, overweight individuals simply eat too much for their activity level; overweight men and women tend toward high caloric intake and low activity.

From what has just been said, it follows that successful weight control would depend upon correcting the imbalance between caloric intake and energy expenditure. If we want to lose weight, we can do it by cutting down on calories, taking in fewer calories than we use, and drawing upon reserve calories stored in our excess weight. After we attain our desired weight we can increase our caloric intake some until it gets to the point where our weight remains constant.

In this program we will adopt the same basic position: the way to lose weight is to reduce caloric intake. We will not prescribe any special or preset diet such as typically found in popular magazines. Rather we will recommend that each day you have a nutritionally balanced food intake. This means each day you should have (a) some meat, fish, or eggs, (b) some green or yellow vegetables, (c) some citrus fruits such as orange or grapefruit juice, (d) a little cereal or bread, and (e) some milk or one of the milk products. And remember: the most important aspect of weight control is maintaining a balance between energy intake and energy expenditure.

Let us now look more closely at the details of our own approach to

weight control. These details are based on the results of previous research. One aspect that previous research has found crucial is that any weight control program has to be preceded by a preliminary stage before any specific procedure for reducing caloric intake be successfully applied. The purpose of such a preliminary stage is two-fold: first to get a picture of your eating patterns or habits (for instance, when you eat, how much you eat, the caloric content of what you eat, etc.); second to obtain information concerning your weight fluctuations (for instance, are the fluctuations occurring more during the week than during the week-end or vice-versa? is there any regularity in the fluctuations? etc.). Such informations subsequently help to plan the most appropriate procedures for reducing caloric intake and also to plan procedures which are based on facts not fiction.

For this preliminary stage to be successful we will require two things from you: (a) that you self-monitor your eating habits and (b) that you show up each week for a weigh-in and for bringing back your self-monitoring data. Let us discuss each of these in some detail.

Self-Monitoring

We want you to self-monitor each day the caloric intake of all foods and beverages ingested. This means to record each day the caloric content of everything you eat and drink and keep a running cumulative total of your caloric intake. I am now going to pass out self-monitoring cards and calorie counting booklets and give specific instructions on how to self-

monitor. (The experimenter passes out the material).

First let us look at the white card. We will call it the self-monitoring card. At the top you put your name, the day, and the date. This means that each day you use a new card. It is also important that you properly identify each card by writing down your name. Then you notice that the card is divided into "time", "situation", "calories", and "total". As indicated, "time" simply corresponds to time of the day or hour: 9.00 a.m., 1.20 p.m., 8.45 p.m., etc. "Situation" refers to where you are when eating or drinking. Let us say, in the morning, before the class starts, you are in the classroom and drink a coffee: so you write down "classroom". Or in the evening you seat in front of the TV and have a piece of cake: you write down "living room (TV)".

Then comes "calories". Here you write down the caloric content of everything you eat or drink. Note this: it is extremely important that you record everything you eat or drink, every time you eat or drink, and immediately after eating or drinking. If you record only some of the things you eat or drink, once in a while, 1 or 2 hours after eating or drinking, this will be of no use at all to get a picture of your eating patterns or habits. Finally, under "total", you keep a cumulative total of your caloric intake so that at the end of the day you know how many calories you consumed during that day (the total is to start at zero each day). So, in your own recording, you should have written down the time, the situation, the number of calories for each occasion of eating or drinking, and a cumulative total of your caloric intake.

Concerning the calorie counting booklet, it will allow you to evaluate

the caloric content of everything you eat and drink. Check the caloric content of everything you eat and drink in this booklet, write it down on the self-monitoring card, make the total for each occasion of eating, and keep a cumulative total of your caloric intake.

The booklet makes calorie counting easy, simple, and quick. It provides you with an alphabetical list of commonly consumed foods; the alcoholic beverages appear at the end. You must pay a particular attention to the portion specified whenever you check a food in this booklet and learn to judge portion size. Nobody expects you to use a tape measure to be sure an apple is exactly 2 inches in diameter but you can recognize the difference between an apple that is average and one that is large. You can also learn to judge portion size so that you know whether your hamburger is 4 ounces or a large one with a correspondingly larger number of calories. This is not really such a chore. Use a scale if you can, for meat, fish, etc., or note on your butcher's or grocer's scale the amount you have bought and subdivide it in equal portions. You should soon be able to determine what, for instance, 4 ounces of fish filet look like or the size of 4 ounces of hamburger. Some of you probably already do.

You must also pay attention to the preparation of a food or what goes with it. A potato ($2\frac{1}{2}$ inches in diameter), for instance, can range from 90 to 500 calories, depending on whether you bake it, mash it with milk and butter, French fry it, or make hashed browns out of it.

You can also evaluate the calories in your own cooking. For example, to determine the caloric content of your meat loaf, just look up each ingredient you use, then total the various figures. Divide the total by the

number of slices you cut, and you will know how many calories in each slice.

In summary pay attention to portion size and preparation while recording the caloric content of everything you eat and drink.

To make sure that everything I said until now is clear in your mind, we will now do a little bit of practice. I will tell you what I had today for dinner and each of you will do the appropriate recording. All right? Today, for dinner (it was 6.15 p.m., I was at home in the kitchen), I had:

- 1 cup of beef noodle soup (70 cal),
- 2 pieces of cod fish, broiled with butter ($2 \times 194 = 388$ cal),
- 2 small white potatoes, boiled and peeled ($2 \times 65 = 130$ cal),
- 1 cup of vegetables, mixed and frozen ($1 \times 122 = 122$ cal),
- 1 cup of plain tea (1 cal).

I ask you to do the appropriate recording and we will check after. What is the caloric content of everything I had for dinner today? You, ok, go ahead! (One subject describes his/her recording). Is there anybody who disagrees with this recording? Is there anybody who recorded this example differently? (If any, we listen to him/her and do the appropriate corrections). So, on my self-monitoring card, for dinner, I put: 6.15 p.m., kitchen, 711 cal, and I add this number to the cumulative total.

Now you should be able to monitor each day the caloric intake of all foods and beverages you consume as we ask you to do. Carry the booklet and the self-monitoring card with you. Each day use a new card. Do not let embarrassment or annoyance interfere.

(For caloric intake monitoring-explicit goal group subjects in pilot experiment only). Now that you know how to monitor your caloric intake each day, the question arises as to what is a reasonable level of intake to aim for. The best information we have is that a goal of 1200 calories per day for women and 1500 calories per day for men is an effective level in bringing about weight loss. During this preliminary phase we ask you to restrict your caloric intake to 1200 calories per day (for women) and to 1500 calories per day (for men).

(For caloric intake monitoring-low goal group subjects in Experiment 1 only). Now that you know how to monitor your caloric intake each day, the question arises as to what is a reasonable level of intake to aim for. The best information we have is that an intake of 500 calories less than your daily maintenance caloric level (which depends itself upon your desirable weight) is an effective level in bringing about weight loss. During this preliminary phase we ask you to restrict your daily caloric intake to 500 calories less than your daily maintenance caloric level.

(For caloric intake monitoring-moderate goal group subjects in Experiment 1 only). Now that you know how to monitor your caloric intake each day, the question arises as to what is a reasonable level of intake to aim for. The best information we have is that an intake of 750 calories less than your daily maintenance caloric level (which depends itself upon your desirable weight) is an effective level in bringing about weight loss. During this preliminary phase we ask you to restrict your daily caloric intake to 750 calories less than your daily maintenance caloric level.

(For caloric intake monitoring-high goal group subjects in Experiment 1 only). Now that you know how to monitor your caloric intake each day, the question arises as to what is a reasonable level of intake to aim for. The best information we have is that an intake of 1000 calories less than your daily maintenance caloric level (which depends itself upon your desirable weight) is an effective level in bringing about weight loss. During this preliminary phase we ask you to restrict your daily caloric intake to 1000 calories less than your daily maintenance caloric level.

Weekly Weigh-Ins

(For pilot experiment only). In order to fulfill the second purpose of the preliminary stage, we ask you to come in each week for being weighed (this includes today). We will meet you individually for 15 to 20 minutes. You will be weighed according to the same procedure that we already used. We will also collect your self-monitoring cards for the preceding week. If you need cards for the coming week, we will give you some. When the preliminary stage is over, we will set another group meeting and plan specific procedures for reducing caloric intake.

Today, before you leave, each of you will be weighed. I also have here a list of available times for meeting with us next week and the following weeks. When waiting for being weighed, would you please choose one of these available times. Next week and the following weeks we will be expecting you at the time you will have chosen. We would be grateful if you respect your choice and show up on time. If it happens that you

cannot come at the usual time, please contact us in advance so that we can set another time for that week.

(For Experiment 1 only). In order to fulfill the second purpose of the 4-week preliminary stage, we ask each of you to come in each week for a weigh-in and for bringing back your self-monitoring cards. Unfortunately, given the great number of persons involved in the program, it will be impossible for us to meet with you individually each week. Here is the way we will proceed. The first week we ask you to drop in (once), to weigh yourself in the bathroom located on the third floor of this building, to register your weight on the back of one of your cards, and to put your self-monitoring cards in a box placed in the bathroom. The second week we will proceed in essentially the same way except that after you weigh yourself I will meet with you individually for about 10-15 minutes: I will collect your self-monitoring cards and I will be glad to answer your questions (if any). The third week we will proceed as for the first week. The fourth week we will meet as a group again and introduce the second phase of the program.

Today, before you leave, each of you will be weighed. (The experimenter describes the procedure). I also have here a list of available times for meeting with us 2 weeks from now. While waiting for being weighed, would you please choose one of these available times. In 2 weeks we will be expecting you at the time you will have chosen. We would be grateful if you respect your choice and show up on time. If it happens that you cannot come at this time, please contact us in advance so that we can set another time.

Does any of you have any questions? (The experimenter answers questions, if any, and concludes as follows). Well, that is it. Remember what you have to do.

(For caloric intake monitoring-explicit goal group subjects in pilot experiment only). You have to self-monitor each day the caloric intake of all foods and beverages ingested, to restrict your caloric intake to 1200 calories per day (for women) and to 1500 calories per day (for men), and to show up each week for a weigh-in.

(For caloric intake monitoring-no goal group subjects in Experiment 1 only). You have to self-monitor each day the caloric intake of all foods and beverages ingested and to show up each week for a weigh-in and for bringing back your self-monitoring cards.

(For caloric intake monitoring-low goal group subjects in Experiment 1 only). You have to self-monitor each day the caloric intake of all foods and beverages ingested, to restrict your daily caloric intake to 500 calories less than your daily maintenance caloric level, and to show up each week for a weigh-in and for bringing back your self-monitoring cards.

(For caloric intake monitoring-moderate goal group subjects in Experiment 1 only). You have to self-monitor each day the caloric intake of all foods and beverages ingested, to restrict your daily caloric intake to 750 calories less than your daily maintenance caloric level, and to show up each week for a weigh-in and for bringing back your self-monitoring cards.

(For caloric intake monitoring-high goal group subjects in Experiment 1 only). You have to self-monitor each day the caloric intake of all foods and beverages ingested, to restrict your daily caloric intake to 1000 calories less than your daily maintenance caloric level, and to show up each week for a weigh-in and for bringing back your self-monitoring cards.

(For pilot experiment only). Make sure before leaving that you have chosen a time for meeting with us next week. Do not forget to bring in your self-monitoring cards. In a few minutes each of you will be individually weighed.

(For Experiment 1 only). Make sure before leaving that you have chosen a time for meeting with us 2 weeks from now. In a few minutes each of you will be individually weighed.

APPENDIX E

POSTQUESTIONNAIRE FOR PILOT EXPERIMENT

Answer each question and give as specific answers as possible.

1. What do you think was going on in this preliminary stage?

2. (Included only in the postquestionnaire given to caloric intake monitoring subjects). At the beginning of the preliminary stage we asked you to self-monitor each day the caloric content of everything you eat and drink. To what extent do you feel that you followed the self-monitoring procedure as prescribed?

(Included only in the postquestionnaire given to restraint monitoring subjects). At the beginning of the preliminary stage we asked you to self-monitor each day instances of restraint. To what extent do you feel that you followed the self-monitoring procedure as prescribed?

3. To what extent do you feel that you self-monitored immediately after eating or drinking?

4. (Included only in the postquestionnaire given to caloric intake monitoring subjects). Did you set for yourself a daily goal in terms of caloric intake? If so, what was your daily caloric intake goal?

(Included only in the postquestionnaire given to restraint monitoring subjects). Did you set for yourself a daily goal in terms of restraints? If so, what was your daily restraint goal?

5. Do you feel that self-monitoring was effective in helping you to lose weight?

6. Following the first group meeting (where the preliminary stage was introduced), to what extent did you expect to lose, maintain, or gain weight?
7. In the preliminary stage it happens that people use some other techniques or procedures (in addition to self-monitoring) to help them dealing with weight reduction. If you did so, please indicate what those were.
8. If you did use some other techniques or procedures, do you feel that they were more effective than self-monitoring in helping you to lose weight?
9. From now on, to what extent do you expect to lose, maintain, or gain weight?

10. To what extent are you satisfied with the program until now?

11. If you have any suggestions that might be helpful if this program was to be run again, please write them down.

APPENDIX F

PROCEDURE FOR THE SECOND PHASE OF THE PROGRAM IN ALL EXPERIMENTS

The preliminary stage is over. This preliminary stage was intended to help you to become fully aware of your daily eating patterns, weight fluctuations, and problematic eating situations. This is crucial because before developing effective self-control in the area of eating, we first have to know what to control.

Today we introduce the second phase of the program. This second phase is concerned with changing your eating patterns through the use of a number of procedures based on learning principles.

Any behavior or action or activity which is learned through various experiences can also be changed through experience. Our eating patterns are habits which have been learned through the years. If everytime we pick up the newspaper or turn on television we grab something to eat, it is nothing but a habit; a coffee break is an office habit; and so on.

Through the years our eating behavior became associated with diverse situations or events. Such situations or events include various kinds of activities, emotional states, interpersonal situations, or other social interactions.

You will modify your eating behavior in two basic ways: first, by reducing or controlling the number of inappropriate situations or events that you respond to by eating; and second, by changing the consequences of eating (i.e., by self-applying positive consequences for appropriate

eating patterns and not for inappropriate eating patterns). By practicing these new eating behaviors for a number of weeks, they will become habits. These new appropriate habits (which fit into your pattern of living and allow for weight loss and maintenance) will replace the old inappropriate habits which resulted in weight gain.

So the purpose of this second phase is not to put you on a diet but to replace old habits with new ones. By dieting we frequently mean eating certain low calorie foods in order to lose weight. Most people could do this and lose weight. However, few would be willing to remain on such a diet for the rest of their life. After weight is lost on a special diet, people usually resume their old eating habits - the very behaviors which caused the weight problem in the first place. For effective weight control, we must alter our eating habits in such a way that we can live with them comfortably for the rest of our life and still maintain a desirable weight. Dieting and changing eating habits are not the same thing. If, for instance, you switch from peanuts to celery while watching TV, you still have the habit of eating while watching TV. Then you should consider yourself, not as dieting, but merely as changing your eating habits in a sensible way. Developing effective self-control in the area of eating requires having a nutritionally balanced food intake each day, under circumstances and with foods which are to be your final eating pattern.

This program does not prescribe a diet and you should not constantly talk with others about dieting as such conversations tend to make you feel deprived of eating pleasures and miss the whole point of the present program: learning appropriate eating habits which will produce weight loss, make it possible for you to maintain this weight loss, and still

allow you to enjoy eating.

Eating habits are somewhat individualized. To cope with this diversity, we have compiled a list of techniques which vary in their appropriateness for different eating styles. An important thing for you is to implement these techniques in a manner appropriate to the circumstances and situations arising in your individual mode of living.

1. Make eating a pure activity.

Never engage in any other activity while eating. When you eat, devote your entire attention to eating. Eating can easily become an automatic action. Actually, many weight problems result from the type of eating that becomes almost unconscious: munching on peanuts while watching the news or eating chips while drinking without realizing what one is doing. Make sure that when you eat you do nothing else (i.e., no television, no reading, no studying, no phone calls, etc.).

2. Develop a routine schedule of eating.

Eat three meals each day and eat at approximately the same time each day. Do not skip meals. It is easier to avoid overeating if you are not overhungry. Do not eat on impulse. Following a strict temporal pattern for eating usually results in feelings of hunger disappearing except just before meal time. At the beginning, if you have difficulty restricting your eating to meals, you should arrange a routine extra feeding such as milk and crackers or vanilla wafers; these, however, should always be taken at the same specified time and dropped as soon as possible.

3. Limit situations in which eating is allowed to occur.

Specify that eating can occur only in one place (e.g., at the kitchen

table). And seat at the table. Do not take snacks into other rooms. Do not eat at your desk. Do not eat in the street. Do not eat in the car. Do not eat while standing up (particularly not in front of the refrigerator). Do not eat casually. Remove food from locations in the home other than the kitchen.

4. Set the table with a complete place setting whenever eating.

Eating should be an event. Even if you have only an apple, put it on a plate. Core it, section it, savor it.

5. Eat slowly.

It takes quite a while (approximately 20 minutes) for your food intake to register with the brain so that you feel satiated. If you eat fast, you may overshoot your body's needs. Set a minimum time for which the meal must last and gradually increase the length of this time limit. Take small bites, chew thoroughly, and swallow before you pick up another forkfull. Put utensil or food item down while chewing and do not pick it up until you have swallowed. Leave table for a brief period between servings or between the meal and dessert so that you get in the habit of starting or stopping your eating at will (it is important that you initially try this when you are moderately full and then gradually work toward situations where you stop eating despite moderate hunger). Require yourself to delay second helpings by at least 10 minutes. Leave the table if you finish before the others; you can then come back later for dessert and avoid sitting at the table confronted with the temptation of consuming more food because other persons are still eating. Take only one helping,

one course, at a time.

6. Reduce the amount of food you serve yourself.

It is much more important for you to work on eating smaller portions of food than to worry about overcoming your lifelong penchant for, let us say, strawberry shortcakes. Start now to cut down the total quantity of food you eat. Gradually decrease the amount: slow changes are likely to be more effective in the long run than are large changes. This can be accomplished by serving and fixing smaller quantities of food. Take small portions. Small portions of food can be made to appear as large as possible by using a smaller plate and spreading the food out on the plate. When food is prepared, it can be served in small portions so a second helping requires the effort of getting up the table and preparing another portion. If you are eating by yourself, prepare the meal, fix your plate, and then put everything away before you sit down to eat. This will insure that you do not continue adding things to your plate. If the entire loaf of bread is lying right there in front of you, you are much more likely to reach for a few extra pieces. Get in the habit of setting limits before you begin eating.

7. Leave food on your plate.

Do not feel that you must complete everything on your plate. Start getting in the habit of leaving a little bit of everything on your plate at the end of each meal. Try to be guided by your feelings of hunger not the amount of food present. This technique is especially appropriate for restaurant eating: do not eat everything put before you simply because you have paid for it. You will be paying a much steeper price if you do.

8. Keep a supply of dietetic or unfattening foods on hand.

The temptation to overeat is great when you have an unlimited supply of sweets, prepared foods, or snacks on hand. Do not keep sweets around the house. Keep a supply of dietetic foods. Rearrange your cupboards so that fattening snacks are in strange, hard-to-reach places but dietetic ones are right up front. Quick preparation foods are also unadvisable. Eat foods that take time to prepare (e.g., if you eat nuts, eat the type which must be shelled; eat popcorn rather than getting out a bag of potato chip). If you have to have a snack, try to make it a less preferred one or something with nutritional value (e.g., a bowl of cereal).

9. Develop other activities incompatible with eating.

Wait a fixed period after the urge to eat before actually eating and try to wait for progressively longer periods of time. If you are having difficulty resisting the urge, do something that prevents you from eating (e.g., make a phone call, go for a walk, begin a project). If there is a regular time each day when you have difficulty (e.g., when you come back from work), plan some activity for this time, form a new pattern (e.g., do not read the newspaper until then, take a shower). If you find that you eat when you are bored, make up a list of things you have been meaning to do (e.g., letter writing, gardening, bill paying) and each time you think about eating, do one of them. Save pleasant activities to be performed when there is a tendency to eat (e.g., during study breaks).

10. Buy and prepare food on a full stomach.

Never go shopping when you are hungry; you are much more likely to buy indiscriminately (both in quantity and in quality) when you are hungry.

Shop from a list (also prepared when you are not hungry). Figure out exactly what you need for a particular period of time and do not overstock. Also, if eating while preparing a meal is a problem, prepare the evening meal immediately after you have finished lunch; this will reduce your temptation to nibble.

11. Plan ahead social events.

If you have to attend a social event at which there will be a great temptation to eat preferred foods, plan ahead what you will have or eat a small low calorie meal before you go. Do not eat while drinking coffee or alcohol.

12. Enlist the help of your family and friends.

Your family and friends can be very helpful in your efforts to lose weight. Now is the time to actively enlist their assistance. Start by making public your commitment to lose weight. In addition, ask your family and friends to do what follows: (a) to praise you for your weight management progress, (b) to prepare and serve you small quantities of food, (c) not to offer you additional food at regular meals or at parties, and (d) to engage in nonfood activities such as taking a walk around the block rather than having an evening snack.

13. Reward yourself for changing eating habits.

This technique is particularly important and we recommend that right now you start applying it. You are encouraged to set up a self-reward system for changing eating patterns. Keep a daily record of whether given eating pattern changes occurred (e.g., no eating between meals, eating at regular hours, eating only in a specified place). You can then award

yourself a point for each behavior complied with and accumulate points toward some prearranged goal. Thus, you can specify that a given number of points must be earned in order to go to the movies, buy an article of clothing, or engage in any other meaningful activity not associated with food. The daily number of points earned can serve as an immediate reward as well as provide feedback of progress, whereas the accumulation of points for a delayed reward sustains the eating pattern changes over a period of time. So you should construct a list of ways by which you can reward yourself for not eating, set a goal, and make a reward contract with yourself for accomplishing the goal.

Here is an example. First you construct a list of ways by which you will reward yourself for changing eating habits. You can reward yourself by buying a new record, or a book, or an article of clothing; let us say that you decide on buying a new record. Then you choose one technique that you want to use until it becomes a new habit: let us say, no eating between meals. You decide that you will reward yourself one point for each day you do not eat between meals. You also decide that 10 points must be earned in order to buy a new record. Each day you record whether no eating between meals occurred and you accumulate points toward the prearranged goal (10 points). When you accomplish the goal, you reward yourself by buying a new record. Then you choose another technique and you proceed in exactly the same way.

We recommend that you choose the easiest technique to begin with and use it until it becomes a new eating habit which is beneficial to you (a minimum of 1 to 2 weeks). Then choose the next easiest technique and

use it until it becomes part of your good eating habits. Continue employing eating control techniques in this manner as long as it takes you to eliminate your bad eating habits and develop new positive eating habits.

Developing self-control over eating behavior is a gradual process involving the planning of goals which are limited enough to be realistic. Too often people set up unrealistic goals that they rarely attain. Eventually they weaken and their attitude becomes: "I have failed again. I am no good. I am not worth all the effort it takes to try to lose weight. What is the use?"

(For the caloric intake monitoring-explicit goal group subjects in pilot experiment only). In addition to applying the techniques we just described, we ask you to continue to self-monitor each day the caloric intake of all foods and beverages ingested and to restrict your caloric intake to 1200 calories per day (for women) and to 1500 calories per day (for men). Daily caloric intakes above 1200 or 1500 calories give such slow results in weight loss as to be too discouraging. Weight loss usually does not proceed evenly and some weeks may show more loss than others although you are decreasing your caloric consumption by the same amount. In general though, an average weight loss of 2 pounds per week can be steadily maintained. The techniques introduced today will help you to restrict your daily caloric intake and accomplish this weekly weight loss goal. Finally, we ask you to continue to show up each week for a weigh-in and for a discussion of your attempts to implement gradually the techniques introduced today.

(For restraint monitoring-no goal group subjects in pilot experiment only). In addition to applying the techniques we just described, we ask you to continue to self-monitor each day instances of restraint. Moreover, we recommend that you exercise eight restraints per day. Eight restraints per day is an effective number in bringing about weight loss. Daily restraints below this number give such slow results in weight loss as to be too discouraging. Weight loss usually does not proceed evenly and some weeks may show more loss than others although you are restraining your food intake by the same amount. In general though, an average weight loss of 2 pounds per week can be steadily maintained. The techniques introduced today will help you to restrain your food intake each day and accomplish this weekly weight loss goal. Finally, we ask you to continue to show up each week for a weigh-in and for a discussion of your attempts to implement gradually the techniques introduced today.

(For restraint monitoring-explicit goal group subjects in pilot experiment only). In addition to applying the techniques we just described, we ask you to continue to self-monitor each day instances of restraint and to exercise eight restraints per day. Daily restraints below this number give such slow results in weight loss as to be too discouraging. Weight loss usually does not proceed evenly and some weeks may show more loss than others although you are restraining your food intake by the same amount. In general though, an average weight loss of 2 pounds per week can be steadily maintained. The techniques introduced today will help you to restrain your food intake each day and accomplish this weekly weight loss goal. Finally, we ask you to continue to show up each week

for a weigh-in and for a discussion of your attempts to implement gradually the techniques introduced today.

(For restraint monitoring-implicit goal group subjects in pilot experiment only). In addition to applying the techniques we just described, we ask you to continue to self-monitor each day instances of restraint. Moreover, we recommend that you exercise eight restraints per day. As mentioned before, eight restraints per day is an effective number in bringing about weight loss. Daily restraints below this number give such slow results in weight loss as to be too discouraging. Weight loss usually does not proceed evenly and some weeks may show more loss than others although you are restraining your food intake by the same amount. In general though, an average weight loss of 2 pounds per week can be steadily maintained. The techniques introduced today will help you to restrain your food intake each day and accomplish this weekly weight loss goal. Finally, we ask you to continue to show up each week for a weigh-in and for a discussion of your attempts to implement gradually the techniques introduced today.

(For the caloric intake monitoring-no goal group subjects in Experiment 1 only). In addition to applying the techniques we just described, we ask you to continue to self-monitor each day the caloric intake of all foods and beverages ingested and to set your own goal in terms of daily caloric intake. The techniques introduced today will help you to restrict your daily caloric intake. Finally, we ask you to continue to show up each week for a weigh-in (for the next 3 weeks).

(For the caloric intake monitoring-low goal, caloric intake monitoring-moderate goal, and caloric intake monitoring-high goal group subjects in Experiment 1 only). In addition to applying the techniques we just described, we ask you to continue to self-monitor each day the caloric intake of all foods and beverages ingested and to aim for the same level of daily caloric intake. The techniques introduced today will help you to restrict your daily caloric intake. Finally, we ask you to continue to show up each week for a weigh-in (for the next 3 weeks).

(For the restraint monitoring-no goal group subjects in Experiment 2 only). In addition to applying the techniques we just described, we ask you to continue to self-monitor each day instances of restraint and to set your own goal in terms of daily restraints. The techniques introduced today will help you to restrain your food intake each day. Finally, we ask you to continue to show up each week for a weigh-in (for the next 3 weeks).

(For the restraint monitoring-low goal, restraint monitoring-moderate goal, and restraint monitoring-high goal group subjects in Experiment 2 only). In addition to applying the techniques we just described, we ask you to continue to self-monitor each day instances of restraint and to exercise the same number of restraints each day. The techniques introduced today will help you to restrain your food intake each day. Finally, we ask you to continue to show up each week for a weigh-in (for the next 3 weeks).

You should try to focus not so much on the target weight and on the rate of loss as on the fact of weight decrease per se. If you are losing

weight, you are moving in the right direction. Contrast this to your old condition of no weight loss or even weight gain and feel good. Sure we would all like to reach our ideal weight instantly by magic but that is not the way things go. So concentrate on the fact of a steady decrease at a rate you can live with and relax. You will get there!

How to Maintain

You have been given methods or techniques to modify your eating habits so that you will lose weight. In the final analysis only you can change yourself, and by continuing to put into practice these techniques you will continue to lose weight and maintain this loss.

A steady gradual weight loss is your best bet to take off pounds. When you reach your desired weight, you can increase slowly your food intake while watching the scale. You will find the amount of food you can consume to keep your weight constant. Then you weigh yourself once or twice a week. We recommend that you set a sort of "safety line" which is never to be bypassed. If you gain and attain this "safety line", immediately take these extra pounds off before letting pound upon pound build up. Start at that very moment a drastic reduction in your food intake for a period of time (e.g., eat only one meal during the day for a few days until your weight drops back below the line). At the same time reexamine the techniques outlined above, find out what went wrong to cause this surge in weight, and take corrective measures.

APPENDIX G

RESTRAINT MONITORING PROCEDURE: PILOT EXPERIMENT AND EXPERIMENT 2

First I would like to welcome you to this weight control program in which each of you has shown himself/herself willing to participate. I remind you that the program, as advertised, is part of an ongoing research project.

All of you know that your main purpose in being here is to lose weight. This weight control program has been specifically designed to help you in your efforts to reduce and regulate your weight. We will provide you with information and suggestions for controlling weight. A crucial factor, however, will be yourself: your motivation to see the program through to the end, your willingness to commit yourself to the necessary tasks of the program, and your willingness to work at each aspect and each phase of the program.

Having said that, I would now like to deal with the causes of being overweight. The scientific literature on this topic points to the fact that while from a physiological point of view being overweight may result from multiple causes, it represents in its simplest form an imbalance between food intake and energy expenditure or, to put it in another way, between the energy we take in through food and the energy we use up through activity or exercise. To maintain a constant level of body weight the food energy must balance the daily energy requirements of the body. When we consume more food than is necessary to produce the energy we expend, excess fat is stored in our body and it takes only 3500 calories to build

1 pound of fat.

Certainly being overweight will not develop unless food intake exceeds energy expenditure. Actually, the only characteristic consistently distinguishing the overweight from the nonoverweight individuals has been overeating. In the great majority of cases, overweight individuals simply eat too much for their activity level; overweight men and women tend toward high food intake and low activity.

From what has just been said, it follows that successful weight control would depend upon correcting the imbalance between food intake and energy expenditure. If we want to lose weight, we can do it by reducing or restraining food intake, taking in less energy than we use, and drawing upon reserve energy stored in our excess weight. After we attain our desired weight we can increase our food intake some until it gets to the point where our weight remains constant.

In this program we will adopt the same basic position: the way to lose weight is to reduce or restrain food intake. We will not prescribe any special or preset diet such as typically found in popular magazines. Rather we will recommend that each day you have a nutritionally balanced food intake. This means each day you should have (a) some meat, fish, or eggs, (b) some green or yellow vegetables, (c) some citrus fruits such as orange or grapefruit juice, (d) a little cereal or bread, and (e) some milk or one of the milk products. And remember: the most important aspect of weight control is maintaining a balance between energy intake and energy expenditure.

Let us now look more closely at the details of our own approach to

weight control. These details are based on the results of previous research. One aspect that previous research has found crucial is that any weight control program has to be preceded by a preliminary stage before any specific procedure for restraining food intake be successfully applied. The purpose of such a preliminary stage is two-fold: first to get a picture of your eating patterns or habits (for instance, when you eat and when you do not, when you "resist temptations" and when you do not, etc.); second to obtain information concerning your weight fluctuations (for instance, are the fluctuations occurring more during the week than during the week-end or vice-versa? is there any regularity in the fluctuations? etc.). Such informations subsequently help to plan the most appropriate procedures for restraining food intake and also to plan procedures which are based on facts not fiction.

For this preliminary stage to be successful we will require two things from you: (a) that you self-monitor your eating habits and (b) that you show up each week for a weigh-in and for bringing back your self-monitoring data. Let us discuss each of these in some detail.

Self-Monitoring

We want you to self-monitor each day food reduction or restraint. This means to record each day the number of times you restrain or reduce your food intake and keep a running cumulative total of the number of your restraints. I am now going to pass out self-monitoring cards and give specific instructions on how to self-monitor. (The experimenter

passes out the material).

We will call this white card the self-monitoring card. At the top you put your name, the day, and the date. This means that each day you use a new card. It is also important that you properly identify each card by writing down your name. Then you notice that the card is divided into "time", "situation", "description", "number of restraints", and "total". As indicated, "time" simply corresponds to time of the day or hour: 9.00 a.m., 1.20 p.m., 8.45 p.m., etc. "Situation" refers to where you are when you decide either to restrain your intake or not to eat at all. Let us say, you are in the cafeteria: you write down "cafeteria". "Description" refers to what is reduced or what is not eaten. Let us say, at lunch time, you decide to eat one piece of bread instead of two as you would like: you write down "1-piece-bread". Or while working at your desk you would like to eat an apple but you decide not to: you write down "1-apple". Then comes "number of restraints": here each time you decide to restrain (while you would like to eat more) or each time you decide not to eat (while you would like to eat), you put a mark. Note this: it is extremely important that you record each instance of restraint very accurately, and immediately after eating or drinking. If you record only some of your restraints, once in a while, 1 or 2 hours after eating or drinking, this will be of no use at all to get a picture of your eating patterns. Finally, under "total", you simply keep a cumulative total of your restraints during the day (the total is to start at zero each day). So, in your own recording, you should have written down the time, the situation, the description of each restraint, the number of restraints and

the total number of restraints to that point in the day.

Let me specify what is meant by "restraint". Each time you feel an urge to eat but you resist and do not eat, that is a restraint. Each time you are tempted to eat this or that but you decide to eat less than you would like, that is a restraint. Each time you plan to eat this or that but again you decide to eat less than you did plan, that is a restraint. Each time you decide not to eat or postpone eating at a later time, that is a restraint.

I will give you some examples. It is breakfast, you are sitting at the kitchen table eating. You have had coffee and a toast and strawberry jam, then a second toast and strawberry jam. You are about to put a third piece of bread in the toaster but you decide not to. That is a restraint. So before leaving the table you write down: 8.15, kitchen, 1 toast and jam, /, 1. Or it is 9.00 p.m. and you are seated in front of the TV watching a fascinating movie. You feel like something to munch on and decide on chips and a coke at the next commercial. When the commercial comes you decide not to and you go back to watching the movie. That is two restraints. You pull out your self-monitoring card (always with you) and record: 9.00 p.m., living room (TV), chips and coke, //, and you write the total number of restraints to that point in the day.

In the next example, I am going to play the role of somebody coming in the cafeteria for lunch. I ask you to do the recording and we will check after. 'Ok! It is 12.30 p.m. I am coming in the cafeteria. I am looking at the menu. "Beef noodle soup... Mushroom soup... I think I will have no soup today (/). Pork sausages... Italian spaghetti...

Fish filet... Yes, I will have some fish filet. Just one piece of fish not two (/)... with potatoes... Please give me just one potato not two (/)... and... green vegetables. Thanks! Desert? Well, not today (/)". I pick up some bread and butter, I go to the cashier, I pay, I find a place, and I do my recording before forgetting.

What do I write down? Is anybody willing to tell me how I should record this example? You? Ok, go ahead! (We listen to the subject). Is there anybody who disagrees with this recording? Is there anybody who recorded this example differently? (If any, we listen to him/her and do the appropriate corrections). So, on my self-monitoring card, I put: 12.30 p.m., cafeteria, 1-soup, 1-piece-fish, 1 potato, 1 desert, and I write the total number of restraints to that point in the day.

Now you should be able to self-monitor each day instances of restraint as we ask you to do. Carry the self-monitoring card with you. Each day use a new card. Do not let embarrassment or annoyance interfere.

(For the restraint monitoring-explicit goal group subjects in pilot experiment only). Now that you know how to monitor restraints each day, the question arises as to what is a reasonable number of restraints to aim for. The best information we have is that eight restraints per day is an effective number in bringing about weight loss. During this preliminary phase we ask you to exercise eight restraints per day.

(For the restraint monitoring-implicit goal group subjects in pilot experiment only). Since we are talking about restraints, it might be appropriate to talk about reasonable levels of restraint to exercise. The best information we have is that eight restraints per day is an

effective number in bringing about weight loss but we will worry about this after the initial phase is over when we get into the next phase.

(For the restraint monitoring-low goal group subjects in Experiment 2 only). Now that you know how to monitor restraints each day, the question arises as to what is a reasonable number of restraints to aim for. The best information we have is that four restraints per day is an effective number in bringing about weight loss. During this preliminary phase we ask you to exercise four restraints per day.

(For the restraint monitoring-moderate goal group subjects in Experiment 2 only). Now that you know how to monitor restraints each day, the question arises as to what is a reasonable number of restraints to aim for. The best information we have is that seven restraints per day is an effective number in bringing about weight loss. During this preliminary phase we ask you to exercise seven restraints per day.

(For the restraint monitoring-high goal group subjects in Experiment 2 only). Now that you know how to monitor restraints each day, the question arises as to what is a reasonable number of restraints to aim for. The best information we have is that 10 restraints per day is an effective number in bringing about weight loss. During this preliminary stage we ask you to exercise 10 restraints per day.

Weekly Weigh-Ins

(For pilot experiment only). In order to fulfill the second purpose of the preliminary stage, we ask each of you to come in each week for being weighed (this includes today). We will meet you individually for

15 to 20 minutes. You will be weighed according to the same procedure that we already used. We will also collect your self-monitoring cards for the preceding week. If you need cards for the coming week, we will give you some. When the preliminary stage is over, we will set another group meeting and plan specific procedures for restraining food intake.

Today, before you leave, each of you will be weighed. I also have here a list of available times for meeting with us next week and the following weeks. When waiting for being weighed, would you please choose one of these available times. Next week and the following weeks we will be expecting you at the time you will have chosen. We would be grateful if you respect your choice and show up on time. If it happens that you cannot come at the usual time, please contact us in advance so that we can set another time for that week.

(For Experiment 2 only). In order to fulfill the second purpose of the 4-week preliminary stage, we ask each of you to come in each week for a weigh-in and for bringing back your self-monitoring cards. Unfortunately, given the great number of persons involved in the program, it will be impossible for us to meet with you individually each week. Here is the way we will proceed. The first week we ask you to drop in (once), to weigh yourself in the bathroom located on the third floor of this building, to register your weight on the back of one of your cards, and to put your self-monitoring cards in a box placed in the bathroom. The second week we will proceed in essentially the same way except that after you weigh yourself I will meet with you individually for about 10-15 minutes: I will collect your self-monitoring cards and I will be

glad to answer your questions (if any). The third week we will proceed as for the first week. The fourth week we will meet as a group again and introduce the second phase of the program.

Today, before you leave, each of you will be weighed. (The experimenter describes the procedure). I also have here a list of available times for meeting with us 2 weeks from now. While waiting for being weighed, would you please choose one of these available times. In 2 weeks we will be expecting you at the time you will have chosen. We would be grateful if you respect your choice and show up on time. If it happens that you cannot come at this time, please contact us in advance so that we can set another time.

Does any of you have any questions? (The experimenter answers questions, if any, and concludes as follows). Well, that is it. Remember what you have to do.

(For the restraint monitoring-no goal group and restraint monitoring-implicit goal group subjects in pilot experiment only). You have to self-monitor each day instances of restraint and to show up each week for a weigh-in.

(For the restraint monitoring-explicit goal group subjects in pilot experiment only). You have to self-monitor each day instances of restraint, to exercise eight restraints per day, and to show up each week for a weigh-in.

(For the restraint monitoring-no goal group subjects in Experiment 2 only). You have to self-monitor each day instances of restraint and to show up each week for a weigh-in and for bringing back your self-monitoring cards.

(For the restraint monitoring-low goal group subjects in Experiment 2 only). You have to self-monitor each day instances of restraint, to exercise four restraints per day, and to show up each week for a weigh-in and for bringing back your self-monitoring cards.

(For the restraint monitoring-moderate goal group subjects in Experiment 2 only). You have to self-monitor each day instances of restraint, to exercise seven restraints per day, and to show up each week for a weigh-in and for bringing back your self-monitoring cards.

(For the restraint monitoring-high goal group subjects in Experiment 2 only). You have to self-monitor each day instances of restraint, to exercise 10 restraints per day, and to show up each week for a weigh-in and for bringing back your self-monitoring cards.

(For pilot experiment only). Make sure before leaving that you have chosen a time for meeting with us next week. Do not forget to bring in your self-monitoring cards. In a few minutes each of you will be individually weighed.

(For Experiment 2 only). Make sure before leaving that you have chosen a time for meeting with us 2 weeks from now. In a few minutes each of you will be individually weighed.

APPENDIX H

ADVERTISEMENT FOR EXPERIMENT 1 AND EXPERIMENT 2

Men and women are invited to participate in a research project designed for weight control and supervised by a professor of the Faculty of psychology of the University of Ottawa. To be eligible, you have to meet the following criteria: (a) a minimum age of 18 years and a maximum of 45 years, (b) a desire to lose at least 15 pounds, (c) nonpregnant status, (d) no surgery in the preceding 2 months, and (e) under no past or present physician's care for a weight related disorder (e.g., hormonal or metabolic disorder).

For more information call at 235-7116 between 4.00 and 7.00 p.m. (preferably) from Monday to Friday.

APPENDIX I

PREQUESTIONNAIRE FOR EXPERIMENT 1 AND EXPERIMENT 2

No one but the person in charge of the present program will have access to this information. This information is collected only for research purposes and is otherwise confidential.

1. Name _____ 2. Age _____ 3. Sex _____
4. Address: present _____
permanent _____
5. Phone number _____ (home) _____ (work)
6. Occupation _____ 7. Education _____
8. Which would you call yourself? (check which applies)
Normal weight _____ Slightly overweight _____ Very overweight _____
9. How many pounds do you want to lose? _____ pounds
10. How many pounds do you want to lose per week? _____ pounds
11. Have you always been overweight (i.e., do you recall your parents having talked about you as always being overweight, even at a very early age), or have you first been overweight at an early age and then only been overweight periodically, or did you become overweight later on (if so, specify at what age)?
☐ As far as I know I have always been overweight
☐ Although I have only been overweight periodically during my life, I first became overweight at the early age of _____
☐ I became overweight later on at the age of _____

12. As far as you know, has anyone in your family had a weight problem (please use one check mark for each grandparent, brother, sister, uncle, aunt, and cousin)?

	Has always been overweight	Has never been overweight	Has been overweight periodically
Grandparents	_____	_____	_____
Father	_____	_____	_____
Mother	_____	_____	_____
Brothers	_____	_____	_____
Sisters	_____	_____	_____
Uncles	_____	_____	_____
Aunts	_____	_____	_____
Cousins	_____	_____	_____

13. Have you ever tried to lose weight? Yes _____ No _____
14. If so, how many times? _____ times
15. How long did you keep trying each time? (average) _____
16. What was the most weight lost? _____ pounds
17. How long did you keep your weight down? _____
18. What methods have you used to lose weight (be as specific as possible)?

19. Which were the most successful methods for losing weight?

20. Why, do you think, you gained weight?

21. How would you rate your desire to lose weight on a scale ranging from 1 to 7 (check which applies)?

1	2	3	4	5	6	7

No desire at all to lose weight	Some desire to lose weight	Reasonable desire to lose weight	Strong desire to lose weight	Very strong desire to lose weight
---------------------------------------	----------------------------------	--	------------------------------------	---

22. Given the effort involved in losing weight, how would you rate your willingness to work hard at this weight reduction program on a scale ranging from 1 to 7 (check which applies)?

1	2	3	4	5	6	7

I would never work very hard at this program	I may not be able to work very hard at this program	I am willing to work moderately hard at this program	I hope to be able to work very hard at this program	I am going to work very hard at this program
---	--	--	---	--

23. Given your own past experience with weight reduction programs or given your general knowledge of weight reduction programs (if you never participated in such programs), how successfull do you expect this program to be (check which applies)?

1	2	3	4	5	6	7

Very low expectations	Low expectations	Moderate expectations	High expectations	Very high expectations
--------------------------	---------------------	--------------------------	----------------------	---------------------------

APPENDIX J

FORM OF ADHERENCE OF SUBJECTS TO EXPERIMENT 1 AND EXPERIMENT 2

I have been invited by an advertisement to participate in a research project supervised by a professor of the Faculty of psychology of the University of Ottawa and designed for weight control. To be eligible I have to meet the following basic criteria: (a) a minimum age of 18 years and a maximum of 45 years, (b) a desire to lose at least 15 pounds, (c) nonpregnant status, (d) no surgery in the preceding 2 months, and (e) under no past or present physician's care for a weight related disorder (e.g., hormonal or metabolic disorder).

Two additional conditions for participating in the program are: (a) no involvement in any other weight reduction program or taking medication for weight (e.g., diet pills) and (b) a \$15.00 deposit (refundable upon participation in the program).

I have met with the person in charge of the program and have been given general information on the nature of the program.

I hereby acknowledge that I am participating in the present research project on a voluntary basis and accept responsibility for my involvement.

Signature: _____

Date: _____

APPENDIX K

POSTQUESTIONNAIRE FOR EXPERIMENT 1 AND EXPERIMENT 2

Answer each question and give as specific answers as possible.

1. What do you think was going on in this preliminary stage?

2. (Included only in the postquestionnaire given to subjects for Experiment 1). At the beginning of the preliminary stage we asked you to self-monitor each day the caloric content of everything you eat and drink, everytime you eat and drink, and immediately after eating or drinking. To what extent do you feel that you followed the self-monitoring procedure as prescribed? (check which applies)

(Included only in the postquestionnaire given to subjects for Experiment 2). At the beginning of the preliminary stage we asked you to self-monitor each day instances of restraint, accurately, immediately after eating or drinking. To what extent do you feel that you followed the self-monitoring procedure as prescribed? (check which applies)

I followed the self-monitoring procedure as prescribed

90 to 100% of the time _____ 80 to 90% of the time _____

70 to 80% of the time _____ 60 to 70% of the time _____

50 to 60% of the time _____ less than 50% of the time _____

Do you have any additional comments?

3. (Included only in the postquestionnaire given to subjects for Experiment 1). Did you set for yourself a daily goal in terms of caloric intake? If so, what was your daily caloric intake goal?

(Included only in the postquestionnaire given to subjects for Experiment 2). Did you set for yourself a daily goal in terms of restraints? If so, what was your daily restraint goal?

Yes ☐ No ☐ My daily goal was _____

4. Do you feel that self-monitoring was effective in helping you to lose weight? (check which applies)

It was very effective _____

It was reasonably effective _____

It was not really effective _____

Do you have any additional comments?

5. Following the first group meeting, to what extent did you expect to lose weight during the 4-week preliminary stage? (circle one specific number)

1 2 3 4 5 6 7

Very low Low Reasonable High Very high
expectations expectations expectations expectations expectations

Do you have any additional comments?

6. In the preliminary stage it happens that people use some other technique (in addition to self-monitoring) to help them dealing with weight reduction. If you did so, please indicate what was this technique.

7. If you did use some other technique, do you feel that it was more effective than self-monitoring in helping you to lose weight? (check which applies)

- ☐ It was more effective
- ☐ It was as effective as self-monitoring
- ☐ It was less effective than self-monitoring
- ☐ It was not effective

8. In the preliminary stage did you find the task hard? (circle one specific number)

1 2 3 4 5 6 7



Very easy

Reasonably
hard

Very hard

9. In the preliminary stage did you find the task aversive? (circle one specific number)

1 2 3 4 5 6 7



Not aversive
at all

Moderately
aversive

Very aversive

10. From now on, to what extent do you expect to lose weight? (circle one specific number)

1 2 3 4 5 6 7

└──────────┴──────────┴──────────┴──────────┴──────────┴──────────┴──────────┘

Very low Low Reasonable High Very high
expectations expectations expectations expectations expectations

11. To what extent are you satisfied with the program until now? (circle one specific number)

1 2 3 4 5 6 7

└──────────┴──────────┴──────────┴──────────┴──────────┴──────────┴──────────┘

Very Reasonably Very
dissatisfied satisfied satisfied

What did you like about the program (until now)?

What did you dislike about the program (until now)?

12. If you have any suggestions that might be helpful if this program was to be run again, please write them down.

13. Name _____

14. To which cultural background do you belong (e.g., French Canadian, Italian, German ...)?

APPENDIX L

Tables of Daily Maintenance Calories (From Bellack, Rozensky, & Schwartz, 1974)

What You Should Weigh

Women Height (with shoes 2-inch heels)	Small Frame	Medium Frame	Large Frame
4 ft. 10 in.	92-98	96-107	104-119
4 ft. 11 in.	94-101	98-110	106-122
5 ft. 0 in.	96-104	101-113	109-125
5 ft. 1 in.	99-107	104-116	112-128
5 ft. 2 in.	102-110	107-119	115-131
5 ft. 3 in.	105-113	110-122	118-134
5 ft. 4 in.	108-116	113-126	121-138
5 ft. 5 in.	111-119	116-130	125-142
5 ft. 6 in.	114-123	120-135	129-146
5 ft. 7 in.	118-127	124-139	133-150
5 ft. 8 in.	122-131	128-143	137-154
5 ft. 9 in.	126-135	132-147	141-158
5 ft. 10 in.	130-140	136-151	145-163
5 ft. 11 in.	134-144	140-155	149-168
6 ft. 0 in.	138-148	144-159	153-173

For girls 18-25, subtract 1 pound for each year under 25.

Men Height (with shoes 1-inch heels)	Small Frame	Medium Frame	Large Frame
5 ft. 2 in.	112-120	118-129	126-141
5 ft. 3 in.	115-123	121-133	129-144
5 ft. 4 in.	118-126	124-136	132-148
5 ft. 5 in.	121-129	127-139	135-152
5 ft. 6 in.	124-133	130-143	138-156
5 ft. 7 in.	128-137	134-147	142-161
5 ft. 8 in.	132-144	138-152	147-166
5 ft. 9 in.	136-145	142-156	151-170
5 ft. 10 in.	140-150	146-160	155-174
5 ft. 11 in.	144-154	150-165	159-179
6 ft. 0 in.	148-158	154-170	164-184
6 ft. 1 in.	152-162	158-175	168-189
6 ft. 2 in.	156-167	162-180	173-194
6 ft. 3 in.	160-171	167-185	178-199
6 ft. 4 in.	164-175	172-190	182-204

How Many Calories to Maintain Your Desirable Weight?

Desirable Weight	18-35 years	35-55 years	55-75 years
Women	Daily Maintenance Calories		
99	1,700	1,500	1,300
110	1,850	1,650	1,400
121	2,000	1,750	1,550
128	2,100	1,900	1,600
132	2,150	1,950	1,650
143	2,300	2,050	1,800
154	2,400	2,150	1,850
165	2,550	2,300	1,950
Men	Daily Maintenance Calories		
110	2,200	1,950	1,650
121	2,400	2,150	1,850
132	2,550	2,300	1,950
143	2,700	2,400	2,050
154	2,900	2,600	2,200
165	3,100	2,800	2,400
176	3,250	2,950	2,500
187	3,300	3,100	2,600