The Effects of Self-Monitoring on the Frequency of Talk-Out Behavior

Jean Casen Romaniuk
Western Michigan University

Follow this and additional works at: https://scholarworks.wmich.edu/masters_theses
Part of the Psychoanalysis and Psychotherapy Commons

Recommended Citation
https://scholarworks.wmich.edu/masters_theses/2577
THE EFFECTS OF SELF-MONITORING
ON THE FREQUENCY OF TALK-OUT BEHAVIOR

by

Jean Casen Romaniuk, M.A.

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Master of Arts

Western Michigan University
Kalamazoo, Michigan
August 1974
ACKNOWLEDGEMENTS

I would like to offer my appreciation to Ms. Marguarite Agase and Ms. Pauline Keith for their daily cooperation and assistance in the maintenance of this project. Further, I would like to extend my gratitude to Drs. Neil Kent, Howard Farris, and Paul Mountjoy for their assistance as advisors in the preparation of this thesis. And finally, I wish to thank the chairman of my committee, Dr. Bradley Huitema, for giving me both the guidance and training necessary to complete this thesis and pursue my graduate education to the doctoral level.

Jean Gasen Romaniuk
INFORMATION TO USERS

This material was produced from a microfilm copy of the original document. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the original submitted.

The following explanation of techniques is provided to help you understand markings or patterns which may appear on this reproduction.

1. The sign or “target” for pages apparently lacking from the document photographed is “Missing Page(s)”. If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting thru an image and duplicating adjacent pages to insure you complete continuity.

2. When an image on the film is obliterated with a large round black mark, it is an indication that the photographer suspected that the copy may have moved during exposure and thus cause a blurred image. You will find a good image of the page in the adjacent frame.

3. When a map, drawing or chart, etc., was part of the material being photographed the photographer followed a definite method in “sectioning” the material. It is customary to begin photoing at the upper left hand corner of a large sheet and to continue photoing from left to right in equal sections with a small overlap. If necessary, sectioning is continued again — beginning below the first row and continuing on until complete.

4. The majority of users indicate that the textual content is of greatest value, however, a somewhat higher quality reproduction could be made from “photographs” if essential to the understanding of the dissertation. Silver prints of “photographs” may be ordered at additional charge by writing the Order Department, giving the catalog number, title, author and specific pages you wish reproduced.

5. PLEASE NOTE: Some pages may have indistinct print. Filmed as received.

Xerox University Microfilms
300 North Zeeb Road
Ann Arbor, Michigan 48106

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
ROMANIUK, Jean Gasen
THE EFFECTS OF SELF-MONITORING ON THE
FREQUENCY OF TALK-OUT BEHAVIOR.

Western Michigan University, M.A., 1974
Psychology, clinical

University Microfilms, A XEROX Company, Ann Arbor, Michigan
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>INTRODUCTION ....................................... 1</td>
</tr>
<tr>
<td></td>
<td>Reliability in Self-Monitoring Research ........... 1</td>
</tr>
<tr>
<td></td>
<td>Reactivity in Self-Monitoring Research ............ 2</td>
</tr>
<tr>
<td></td>
<td>Clinical Application of Self-Monitoring Research 3</td>
</tr>
<tr>
<td></td>
<td>Covert Behaviors in Self-Monitoring Research ...... 5</td>
</tr>
<tr>
<td></td>
<td>Timing and Form in Self-Monitoring Research ...... 7</td>
</tr>
<tr>
<td></td>
<td>Purpose of the Thesis. ............................ 11</td>
</tr>
<tr>
<td>II</td>
<td>METHOD .............................................. 12</td>
</tr>
<tr>
<td></td>
<td>Subjects ......................................... 12</td>
</tr>
<tr>
<td></td>
<td>Procedure. ........................................ 12</td>
</tr>
<tr>
<td>III</td>
<td>RESULTS ............................................. 15</td>
</tr>
<tr>
<td></td>
<td>Descriptive Analysis ............................. 15</td>
</tr>
<tr>
<td></td>
<td>Inferential Analysis ............................. 20</td>
</tr>
<tr>
<td>IV</td>
<td>DISCUSSION ......................................... 22</td>
</tr>
<tr>
<td>V</td>
<td>FINAL SUMMARY. .................................... 25</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>................................................. 26</td>
</tr>
<tr>
<td>APPENDIX A</td>
<td>.............................................. 29</td>
</tr>
</tbody>
</table>
INTRODUCTION

The utilization of self-monitoring techniques for behavior change has become a topic of renewed interest in the behavioral sciences (Kanfer & Phillips, 1970a). Typically, self-monitoring is defined as the systematic observation of one's own behavior across a specified period of time. The most recent literature in this area has focused upon two major research questions: the first considers the use of self-monitoring as a viable methodological procedure, and the second hypothesis explores the clinical applications of self-monitoring as a mechanism of behavior change.

Reliability in Self-Monitoring Research

Research on the methodological aspect of self-monitoring has usually concerned the reliability of this procedure (Simkins, 1971). Several studies which discuss the reliability of self-observation emphasize the difficulty in obtaining accurate reliability estimates. For example, a unique problem found in self-recording has been that the subject serves both as the observer and the observed simultaneously. Therefore, efforts to obtain independent estimates of behavioral occurrence or nonoccurrence become extremely difficult, if not impossible, from a logistical standpoint. In order to circumvent this problem, another observer is usually asked to check the frequency or duration of the behavior being self-observed. The degree to which...
the subject and the observer agree on the behavior being monitored is
sometimes quoted as a measure of reliability. There are, however,
several important limitations in this example. The first limitation,
as pointed out by Kanfer (1970a) concerns the difficulty in obtaining
an interobserver reliability estimate of a self-recorded behavior when
the behavior has no external referent. Studies by McFall (1970),
Goldiamond (1967), and Homme (1965), illustrate some of the unobserv­
able or covert behaviors which fit this category in self-control
research. Secondly, even if the behavior under investigation is ob­
servable, differences in reliability can still result from other
influences such as differences in response definition between the
subject and the observer (Simkins, 1972).

Finally, the usefulness of interobserver agreement as an over­
all measure of reliability can be questioned. As pointed out by
McCaw, Wardrop, and Bunda (1972), other sources of variability such
as intrasubject variability or daily environmental changes may contri­
bute to error variance. Frequently, these factors are either over­
looked or are thought to be unimportant when coefficients of agree­
ment are obtained.

In summary, the reliability of self-recorded behaviors is usually
difficult to estimate. This is due to having no external referent,
differences in response definition and intrasubject changes.

Reactivity in Self-Monitoring Research

A second major methodological consideration has been the reac­
tivity of the measuring instrument. In this case, reactivity would
include changes in the self-monitored behavior due to the measurement procedure itself. Several recent examples in the literature (Gottman & McFall, 1972; McFall, 1970; Rutner & Bugle, 1969) have indicated that self-monitoring techniques may affect the rate of the behavior under observation.

In the most recent study by Lipinski and Nelson (1974), the reactivity of self-monitoring procedures was measured. The procedure used to assess reactivity involved having an independent, unobtrusive observer measure the target behavior (face-touching) across several experimental conditions including: a baseline condition, two self-recording conditions and a return to baseline condition. The results of this study indicated that a significant decrease in face-touching behavior occurred during the self-recording conditions as compared to both the baseline and return to baseline phases. Thus, the process of self-measurement had an effect on the rate of the behavior being monitored.

The question of reactivity has been shown to have direct implications for clinical applications of self-monitoring techniques. As stated by Johnson and White (1971), "... self-observation procedures may have important reactive effects on the observed behaviors [and] ...these reactive effects may be used to produce desired behavior change [p. 496]."

Clinical Applications of Self-Monitoring

The usefulness of self-monitoring as a clinical procedure has been frequently discussed in the literature (Goldiamond, 1965; John-
son & White, 1971; McFall, 1970; Thoreson & Mahoney, 1974). In general, self-monitoring procedures have been seen as an essential ingredient in the initial stages of self-control procedures. In support of this, Kanfer (1970) has stated that a subject's knowledge of his own target behavior is a necessary prerequisite to its modification, especially in issues of self-control.

However, the efficacy of self-monitoring as a change agent in and of itself should not be underemphasized. Clinical research which has utilized self-monitoring as at least one part of its treatment procedure covers a wide range of behavioral applications. For example, research to date includes such areas as smoking (Azrin & Powell, 1968; McFall, 1970), obesity (Mahoney, 1973; Stuart, 1967), studying (Johnson & White, 1971; Broden, Hall & Mitts, 1971), oral class participation (Gottman & McFall, 1972), multiple tics (Thomas, Abrams & Johnson, 1971), and between meal eating (Epstein & Peterson, 1973). The major finding of these studies has been that the act of recording or monitoring a certain behavior has a reactive effect on the behavior itself.

For example, in the study by Johnson and White (1971), it was found that a group asked to observe and record their studying behavior for a particular undergraduate course achieved significantly higher grades than two other control groups not involved in self-monitoring procedures. Similarly, in the study by Gottman and McFall (1972), the rate of oral class participation increased as a function of self-monitoring techniques. In both these cases, as well as in the other studies cited above, the target behavior was modified by syste-
matic self-observation of the particular behavior under investigation. Furthermore, changes in the target behavior were found to be in a positive or desired direction.

A few researchers, however, have found the effects of self-monitoring to be either minimal (Mahoney, Moore & Wade, 1973) or short-lived (Broden et al., 1971). In the Mahoney et al. (1973) study, four different weight reduction groups were established; a self-reward plus self-monitoring group, a self-punishment plus self-monitoring group, a self-monitoring only group, and an information-only group. The results indicated that the self-monitoring only group and information-only group demonstrated the least amount of weight loss. In part of the Broden et al. (1971) study, talking-out behavior was self-monitored by an eighth-grade student. It was found that while self-monitoring had an initial effect on the target behavior in the desired direction, the effect was only temporary. That is, after an initial reduction in talking-out, the behavior returned to its baseline rate over repeated self-monitoring sessions.

The combined results of the two previous studies suggest that self-monitoring procedures may be initially successful in modifying behavior, but must be supplemented with other treatment strategies to ensure effective maintenance of the behavior in the desired direction.

Covert Behaviors in Self-Monitoring Research

Research on the analysis of covert self-monitoring has been somewhat scarce in behavioral literature. The first real mention of covert-operants or "coverants" was made by Homme (1965) in a paper
which used the coined term "coverant" to refer to covert verbal operants. In this paper, Homme discussed the use of covert analysis in behavioral research and postulated an assumption of homogeneity between overt and covert operants with respect to behavioral laws and principles. In support of the usefulness of coverant research, Nelson and McReynolds (1971) further point out how a more functional level of behavior analysis could be achieved. That is, by isolating particular covert antecedents to overt behavior, modification of the contingencies following these "coverants" could lead to a change in the target behavior without direct manipulation of the contingencies related to the overt behavior. This knowledge could be extremely useful with problems such as exhibitionism, or severe aggression where modification of the antecedents to overt behavior would be desired.

However, Homme (1965) also discussed the potential problems associated with "private events". The first such problem, which relates directly to the problem of interobserver reliability mentioned in the section on reliability of self-monitoring research, involves the inability of the experimenter to detect the occurrence or non-occurrence of the covert response. The most frequent attempt to circumvent this problem, from the experimenter's viewpoint, has been to record an overt behavior which is believed to be highly correlated with the covert response. As Nelson and McReynolds (1971) point out, the success of this procedure depends upon the degree of functional relationship between the covert antecedent and the overt behavior. To date, there have been two major self-monitoring studies (Gottman &
McFall, 1972; McFall, 1970) which have used covert responses as one of the target behaviors under analysis. The particular type and form of the responses which were employed, as well as the implications for this thesis, follow below.

Timing and Form in Self-Monitoring Research

In self-monitoring research, the manner in which the behavior is self-observed has taken several forms. For example, a few of the devices which have been used to measure self-monitored responses in the past include: booklets (Epstein & Peterson, 1973), wristcounters (Ernst, 1973; Lindsay, 1968), charts (Mahoney, 1972), "countoons" (Kunzelmann, 1970), and index cards (Broden et al., 1971).

Aside from the actual device used, there are other important issues surrounding the method of self-observation employed. Differences in method can be broken down into two major categories: the first category considers the point in the behavioral chain in which the self-monitored response is made and the second considers the type of response being self-monitored.

In the first instance, a distinction can be made between the temporal relationship of the self-monitoring process and the target behavior. Although most studies do not specify when the self-monitoring response is emitted, it is usually the case that it follows the "target" behavior, whether the behavior is overt or covert. For the purpose of this thesis, the timing of the self-monitored will be considered only in relation to the overt behavior. In other words, discrimination between an antecedent self-monitored response and a
consequent self-monitored response will be descriptive of whether the self-monitored response has been made prior or subsequent to the actual overt behavior.

As outlined above, the second issue concerns the form of the self-monitored behavior. An emphasis on form can be broken into two subcategories: (a) whether the form of the response being measured is overt or covert and (b) whether the actual self-monitored response has "positive" or "negative" stimulus value in relation to the actual behavior being self-monitored.

In the first case, a delineation is usually made between the recording of urges or other imaginal behaviors and the recording of behaviors which are observable to individuals other than the subject. An illustration of this in self-monitoring research is evident in the McFall (1970) study. He compared the rate of cigarette consumption for two self-monitoring groups. The first group was asked to record each time they engaged in smoking while the second group was asked to record each time they had an urge to smoke, but for whatever reason did not. Thus, the first group was recording an overt behavior and the second a covert behavior. Estimates of interobserver agreement for both groups were based upon the number of cigarettes smoked during a particular undergraduate class. The results of this study were somewhat equivocal in that those engaged in recording the number of cigarettes smoked increased their average rate of smoking while those in the second group decreased the average number of cigarettes smoked. Possible methodological errors, including knowledge of experimenter expectancies, have been eloquently presented by Orne (1970). Never-
theless, the questions raised by his study have stimulated further research in the area.

A second study by Gottman and McFall (1972) provides another example of the different type of responses which can be self-monitored. This study investigated the differences in the rates of oral class participation as a function of the different self-monitoring techniques employed. Both groups were asked to self-monitor the number of times they would like to participate in class discussion, but for whatever reason did not, as well as the number of times they actually contributed to class discussion. These two self-monitoring methods were utilized, one at a time, by both groups in differing orders. The results indicated that subjects showed an increase in whichever particular response they were monitoring, e.g. when asked to self-monitor the number of oral class remarks talking increased, and when asked to self-monitor the "urges" to talk not emitted, the rate of talking decreased. Thus, the rate of oral class participation was significantly affected by the self-monitoring procedure used.

Analysis of these two studies in regards to the timing of self-monitoring revealed confounding results. Both studies used two self-monitoring conditions, the first being an observational record of "urges" not carried out and the second being a record of actual number of overt responses. Thus, the first self-monitoring condition required the self-observation and recording of an antecedent covert stimulus while the second self-monitored condition utilized a consequent overt stimulus. Therefore, the independent roles of these two
variables were inextricably confounded.

The issue of the stimulus "value" in relation to the self-monitoring response has rarely been discussed. Usually however, the stimulus value has referred to the reinforcing or punishing characteristics of the self-monitored behavior. In the two studies cited previously, (Gottman & McFall, 1972; McFall, 1970) no mention was made of the stimulus value associated with the particular self-monitored responses used. However, Gottman and McFall (1972) did consider the general possibility that other types of self-monitored behavior may be differentially affected by (a) either the "value" of the stimulus assigned by the subject or by the experimenter and (b) the point in the response sequence where the subject is asked to emit the self-monitored behavior.

Further, the relationship between the target behavior and the self-monitored response with respect to the reinforcing or punishing nature of self-monitoring has not been discussed in these studies. For example, it would seem possible to say that the act of self-recording a behavior which the individual finds reinforcing might increase the rate of that behavior. Similarly, the act of recording a behavior which the individual finds aversive might lead to a decrease in the overt behavior. Therefore, on that basis, it might be plausible to state that the relative reinforcing (or punishing) characteristics of self-monitoring were partially determined by the individual's past history with the target response of interest.

Since neither the McFall (1970) nor Gottman and McFall (1972) studies discussed the properties associated with their respective target
behaviors, it would be difficult to speculate what these effects would have had on the dependent variable which they analyzed.

Purpose of the Thesis

Three research questions will be considered in light of the preceding literature review: (a) Can the findings of Broden et al. (1971), Gottman and McFall (1972), and McFall (1970), etc., be replicated with respect to the reactivity of self-monitoring? (b) If a change in the dependent variable is evidenced, does this effect appear to be continuous or of short-term duration? (c) What is the effect of two different types of self-monitoring procedures on the dependent variable? This third research question is based upon the studies by Gottman and McFall (1972) and McFall (1970) in which it was found that the self-monitoring of overt behaviors resulted in their increase while the monitoring of their nonoccurrence ("urges" not carried out) resulted in a decrease in the rate of the overt behavior.
METHOD

Subjects

Two young males, ages 11 and 12, served as subjects for this study. Both subjects were part of a behaviorally oriented special education classroom of approximately 10 students. Each subject was selected for the classroom on the basis of "emotional" rather than physical instability in the regular classroom.

When subjects were informed of the experimental procedure, emphasis was placed upon the accuracy of recording individual behaviors, rather than any desired direction of behavior change (see Appendix A). Although both subjects were informed of the other's participation in the experiment, they were also told that they would be recording different behaviors.

Procedure

Subjects were observed during a language period each day. The rate of talking-out behavior was recorded for both subjects by the experimenter throughout the study. Talking-out was defined as "any standard dictionary verbalizations which could be heard at a distance of at least 10 feet and which were emitted without prior consent of the personnel in charge." Consent was defined as a verbalization of the subject's name by the personnel in charge with or without the subject's arm raised. Personnel in charge included the teach-
er, teacher's aide, and class consultant. Following any talking-out behavior, a latency period of two seconds determined a new, distinct talk-out behavior. Since the duration (in seconds) of any one talk-out was extremely short, the absolute rate or number of talk-outs was recorded.

During an instruction session just prior to the first self-monitoring session, subjects were informed of their selection for participation in a short experiment. At that time, subjects were given instructions regarding the form of self-monitoring in which they would be engaged (see Appendix A). Subject 1 was asked to record each instance he thought he was about to talk-out, but for whatever reason, did not. Subject 2, on the other hand, was asked to record each talk-out at the moment before its occurrence. In this way, both subjects would be recording covert antecedents to the overt target behavior. When subjects were asked to give a description to the teacher as to what they should record, both repeated the directions accurately, and Subject 2 even remarked that they would simply be recording the "opposite" behaviors. Following the completion of the verbal instructions, each subject was given a modified golf wrist-counter and allowed to familiarize himself with its operation.

During the initial self-monitoring session, the teacher informed the class of the subjects' participation in a "small experiment".

\[1\] Actually, the wrist band was taken off the "wrist-counter" and the remaining mechanism (approximately 1 inch by 1 inch) was held in the palm of the hand, since it was found to be more easily manipulated by the subject in this manner.
Subjects were asked to display the counter to the rest of the class and describe the behavior they would be counting. Following a short description of the purpose of the experiment to the rest of the class, (the same that had been described to the subjects during the instruction session), the first self-monitoring session was begun.

Prior to the second session, the teacher again prompted a verbal response from the subjects by asking them what behaviors they were going to record. In all succeeding sessions, no instructions or comments were given to the subjects regarding any self-monitoring procedures.

As a check on the experimenter's accuracy of observation, during Sessions 17, 19, 20, and 21 for Subject 1 and Sessions 19, 22, and 23 for Subject 2, estimates of interobserver agreement were calculated. Observers maintained independence during each session and recorded each talk-out emitted by the subjects. A coefficient of agreement was determined by forming the ratio of the total number of agreements divided by the total number of agreements and disagreements.
RESULTS

Descriptive Analysis

An analysis of the average number of talk-outs per minute for Subject 1 is presented in Figure 1 (p. 16). During baseline, the pattern of responding was somewhat erratic ($\delta_y = 0.5337$) and the mean rate of talking-out was higher than during the intervention condition ($\hat{\mu}_{\text{baseline}} = 0.957$ and $\hat{\mu}_{\text{intervention}} = 0.415$).

For Subject 2 a somewhat less erratic pattern of responding was evidenced (see Figure 2, p. 17). The mean level during baseline was higher for this subject ($\hat{\mu}_{\text{baseline}} = 1.41$) than for Subject 1 but a similar downward trend on the dependent variable during intervention was detected ($\hat{\mu}_{\text{intervention}} = 0.9066$). Although Subject 2 emitted an almost cyclical pattern of response variability across baseline, the standard deviation for this subject ($\delta_y = 0.4995$) did not appear to be significantly different from the same value for Subject 1 ($\delta_y = 0.5337$), who also showed a less variable but more erratic baseline pattern of performance.

An informal analysis was made between the actual rate of talking-out, and the reported number of self-monitored responses made by each subject during intervention. In Table 1a (p. 18), a relationship between the number of occasions in which the subject reported that he wanted to talk-out but didn't is shown with the actual number of talk-outs recorded by the experimenter. Although no particular
Fig. 1. The actual and predicted number of talk-outs per minute for Subject 1
Fig. 2. The actual and predicted number of talk-outs per minute for Subject 2.
### TABLE 1a

Self-Recorded Number of "Urges" Suppressed vs. Experimenter Recorded Number of Talk-Outs

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Subject 1</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sessions</td>
<td>Self-Recorded</td>
<td>Experimenter Recorded</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>21</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 1b

Self-Recorded Number of Talk-Outs vs. Experimenter Recorded Number of Talk-Outs

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Subject 2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sessions</td>
<td>Self-Recorded</td>
<td>Experimenter Recorded</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>
relationship is implied this comparison, it is interesting to note the difference between the record of this subject's self-monitoring responses in comparison with Subject 2's record (see Table 1b, p.18). In the second half of Table 1, the relationship between the experimenter's record of talk-outs and the subject's self-monitored record of talking-out are shown. From a comparison of these two tables, it is evident that the number of self-monitored responses given by Subject 2 declined after the first 3 sessions of intervention, while Subject 1 continued to record self-monitored responses. Observations made by the experimenter also indicated that Subject 1 continued to attend to the self-recording device while Subject 2 spent decreasing amounts of time holding as well as attending to the self-monitoring device during intervention sessions.

Finally, calculations were made on the agreement between two unobtrusive observers (Webb, Campbell, Schwartz, & Sechrest, 1966). For Subject 1, agreement percentages were 80%, 94%, and 89% for Sessions 17, 19, and 20 of baseline and 80% for intervention Session 21. For Subject 2, agreement percentages of 81% and 94% were calculated during Sessions 19 and 22 of baseline and an agreement coefficient of 80% was determined for the first session in intervention (Session 23).
Inferential Analysis

In the analysis of single organism studies, it is known that ordinary parametric and nonparametric significance tests such as $t$, $F$, Mann-Whitney and Kruskal-Wallis are inappropriate. A critical assumption underlying the use of these tests is the statistical independence of the observations under analysis. While this assumption can be met in most group studies where subjects are randomly assigned to treatment levels, it is generally more difficult to meet this assumption when a single subject's behavior is measured frequently across time. If an ordinary analysis of variance, for example, were used with single organism data, the probability of making a Type I error might be much greater than the nominal value set by the Experimenter.

Several statistical models have been suggested in the methodological literature which are appropriate for the analysis of single organism data (Jones, 1969; Box and Tiao, 1965). For the analysis of this data, a Markov or autoregressive time series model was employed utilizing a time series change detection program developed by Jones (1969), and Stoline and Houchard (1974).

The results of this time series analysis are presented in Table 3. For each subject, both the actual intervention value, as well as a predicted intervention value are given. Time series $t$ tests which were based on the discrepancy between these two values, were all nonsignificant at $\alpha = .05$ for both subjects. An overall $F$ computed on the entire interval did not yield significant results for either subject (see Table 3, p.21).
## TABLE 2

**Analysis And Summary**

**Of Intervention Data**

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Subject 1</th>
<th></th>
<th></th>
<th>Subject 2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sessions&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Actual Y</td>
<td>Predicted Y</td>
<td>t</td>
<td>p</td>
<td>Actual Y</td>
<td>Predicted Y</td>
</tr>
<tr>
<td>1</td>
<td>.260</td>
<td>1.048</td>
<td>-1.47</td>
<td>.158</td>
<td>.526</td>
<td>1.459</td>
</tr>
<tr>
<td>2</td>
<td>.421</td>
<td>.882</td>
<td>- .86</td>
<td>.401</td>
<td>.894</td>
<td>1.711</td>
</tr>
<tr>
<td>3</td>
<td>.500</td>
<td>.899</td>
<td>- .74</td>
<td>.468</td>
<td>.153</td>
<td>1.568</td>
</tr>
<tr>
<td>4</td>
<td>.583</td>
<td>.907</td>
<td>- .60</td>
<td>.556</td>
<td>.923</td>
<td>1.498</td>
</tr>
<tr>
<td>5</td>
<td>.360</td>
<td>.916</td>
<td>-1.04</td>
<td>.312</td>
<td>1.280</td>
<td>1.576</td>
</tr>
<tr>
<td>6</td>
<td>.356</td>
<td>.892</td>
<td>-1.00</td>
<td>.330</td>
<td>.425</td>
<td>1.454</td>
</tr>
<tr>
<td>7</td>
<td>.318</td>
<td>.892</td>
<td>-1.07</td>
<td>.298</td>
<td>.818</td>
<td>1.745</td>
</tr>
<tr>
<td>8</td>
<td>.529</td>
<td>.888</td>
<td>- .67</td>
<td>.511</td>
<td>1.234</td>
<td>1.612</td>
</tr>
</tbody>
</table>

Overall F = .9465  p = .504  

Overall F = 2.1094  p = .084

Note.- All actual and predicted Y values are listed in terms of the average number of talk-outs per minute.

<sup>a</sup>Session numbers listed in this table differ from actual session numbers taken from raw data. However, they still represent the same session order of all intervention sessions.
DISCUSSION

The results of this study indicated that the direction of change in the dependent variable was consistent for both subjects and was desirable from both the students' and the teacher's perspective. However, from the basis of the information collected, there was not sufficient evidence to conclude that there were significant differences between baseline and intervention periods.

The most obvious conclusion to be drawn from this result is that the self-monitoring procedures were not effective in modifying the rate of talking-out behavior. However, since the direction of change was similar for both subjects for all intervention values, then perhaps other explanations for the lack of significance could be generated.

Most notably, there was a lack of precision during baseline which would be evidenced from the size of the standard deviations for both subjects. This imprecision could be the result of at least three factors. From a design standpoint, the first factor contributing to possible insignificance of results was the lack of control during the course of the study. Occasional changes in teachers, as well as differences in the content of the language discussion periods tended to affect the rate of talking-out in both subjects. Secondly, from a statistical perspective, the relatively small number of observations during baseline made attainment of significance more difficult since
the power of the time series test was partially a function of the num-
ber of baseline observations.

And thirdly, a cellar effect may have been encountered in the
measurement of the lower rates of talking-out, especially for Subject
1. This would be based upon the low operant rates for the subject
as well as the large variability emitted during baseline.

It would be difficult to discuss the duration of the effects of
self-monitoring since no significant deviation from a baseline mean
rate was found. However, with respect to the duration of interest in
the self-monitoring procedure itself, it appeared as though Subject
1 and 2 differed. For Subject 1, the recording of the urges to talk-
out not emitted was maintained throughout intervention. For Subject
2, the recording of self-monitoring declined to zero by the fourth ses-
sion of intervention and remained there with the exception of one
self-recorded response in the sixth intervention session. One ex-
planation for the difference might be that the act of recording a
reinforcing behavior (not talking-out) would tend to be reinforcing
and therefore maintained. Whereas, for Subject 2, the act of record-
ing an aversive behavior (talking-out) might be aversive and would
tend to be avoided. The strength of the explanation remains to be
seen however, since individual subject differences could easily ac-
count for this same difference. Replication, both in the form of more
single organism data, as well as larger group data, would greatly
enhance the adequacy of this supposition.

The results of this study in regards to the direction of behavior
change did not agree with the findings of Gottman and McFall (1972)
and McFall (1970). In this study, it was found that self-monitoring of the occurrence of talking-out as well as its nonoccurrence ("urges" not emitted) resulted in a decreasing rate of talking-out. In the two studies cited above, the self-monitoring of the occurrence of a behavior resulted in its increase while the self-monitoring of the nonoccurrence of a target behavior resulted in a decrease in the rate of that behavior. One possible explanation for this difference may have been the differences in the value of the target behavior made by the subjects. If, in this study, talking-out was an undesirable behavior for the subject's perspective then any attempt to reduce its frequency would be reinforcing to the subjects. Therefore, self-monitoring of its occurrence might be avoided by the subject by reducing the frequency of the target behavior just as self-monitoring of its nonoccurrence might be reinforcing to the subject and result in (a) an increase in not talking-out and (b) a subsequent decrease in the rate of talking-out.

Since no mention was made of the value (desirability) of the target behavior in the other two studies, it would be difficult to speculate on the differences in the direction of behavior change during self-monitoring sessions.
The purpose of this study was to assess the effectiveness of differential self-monitoring procedures on a specific overt target behavior. The general trend of the results indicated that self-monitoring may have reduced the rate of talking-out, although this was not found to be statistically significant.

Future research in this area should systematically take into account the target behavior, since differences in performance levels during self-monitoring may be a function of the reinforcing or punishing characteristics of the target behavior being self-observed. Ideally, research should be directed toward finding target behaviors with "neutral" status so that any historical differences brought into the experiment by the subjects would be minimized. In this way, differences in the type of self-monitoring procedure employed could be evaluated more clearly.

Another suggestion for future investigations would include a continuation of the use of statistical time series programs to aid in the evaluation of serially presented single organism data.

It is hoped that the questions raised by this thesis, as well as the statistical analysis used, will encourage further innovative research in this area. Given the current demand for self-change strategies by a number of different individuals with varying behavioral problems, it would appear to be a most logical direction in which to concentrate our future research efforts.
REFERENCES


Homme, L. E. Perspectives in psychology: XXIV. Control of coverants, the operants of the mind. *Psychological Record*, 1965, 15, 501-511.


26

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.


Orne, M. T. From the subject's point of view, when is the behavior private and when is it public?: Problems of inference. *Journal of Consulting and Clinical Psychology*, 1970, 35, 143-147.


APPENDIX A

Instructions for Subject 1 and Subject 2
Subject 1

I would like to have your help in carrying out a short project. This project will involve keeping track of one of your behaviors with this hand counter. The behavior you will be counting has to do with talking-out. Remember that talking-out is saying something to me or another classmate, or even making sound like "oh" or "I know" with your hand raised, but before you are called on.

You will be able to use these counters to help you keep a record of each talk-out. Here are the directions for how to use this counter. Place it in the palm of your right hand (like this) and press in completely with your thumb. Notice the two counters that have moved. The top counter keeps going up one number each time while the bottom counter goes to nine and returns again to zero. O.K.?

Now you may practice holding it and pressing in on this button.

Remember I said the behavior you will be counting has to do with talking-out? Well, what you will actually count is each time you think you are going to talk-out but do not actually talk-out. That is, if you are about to say something to me or another person before you are called on but then do not say it, you would press in on the button. Do this each time you think about talking-out but do not talk-out.

You will record this behavior during language class for a while. You will only have to record while you are in your seat. That is, if you are asked to get up in front of the class, you should leave your counter on the desk and pick it up again when you return to your
seat. I have asked Rick to work with me also on this project although he will be recording something different from you.

If I find that you can do an accurate job of counting your behavior with these new counters, then I may try using them with the rest of the class later.

Don't forget, then, that it is important for you to count each time you think you are going to talk-out but then do not do so. O.K., I'll give you the counter back right before class. Do you have any questions?

Subject 2

I would like to have your help in carrying out on a short project. This project will involve keeping track of one of your behaviors with this hand counter. The behavior you will be counting is talking-out. Remember that talking-out is saying something to me or another classmate, or EVEN making sounds like "oh" or "I know" with your hand raised, but BEFORE you are called on.

You will be able to use these counters to help you keep a record of each talk-out. Here are the directions for how to use this counter. Place it in the palm of your right hand (like this) and press in completely with your thumb. Notice the two counters that have moved. The top counter keeps going up one number each time while the bottom counter goes to nine and returns again to zero. O.K.? Now you may practice holding it and pressing in on this button.

Remember I said the behavior you will be counting has to do with talking-out? Well, what you will actually count is each time you are
about to talk-out. In other words, press in on the counter RIGHT
BEFORE you are going to talk out.

You will record this behavior during language class for a while.
You will only have to record while you are in your seat. That is, if
you are asked to get up in front of the class, you should leave you
counter on the desk and pick it up again when you return to your
seat.

I have asked Jerry to work with me also on this project although
he will be recording something different from you.

If I find that you can do an accurate job of counting your be-
behavior with these new counters, then I may try using them with the
rest of the class later.

Don't forget then, that it is important for you to count each
time you are just about to talk-out. O.K., I'll give you the counter
back right before class. Do you have any questions?