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Some Determinants of Self-monitoring Effects

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This laboratory study of self-monitoring effects examined the hypotheses that the direction of reactive effects is a function of the perceived value of the target behavior; that neither the behavior's value nor self-monitoring alone is sufficient to produce significant effects but that both are necessary; that self-monitoring is more reactive than monitoring by the experimenter; that multiple reports of monitoring are more reactive than a single report of monitoring; and that self-monitoring effects are more reactive than the effects of merely attending to a particular behavior. The target behavior chosen was the eyeblink response. The results provide general support for the first two hypotheses and suggestive support for the third hypothesis. Results pertaining to the fourth and fifth hypotheses took an unexpected twist and suggest the need for further study.

Research on self-monitoring has been addressed to three main questions: First, how reliable and valid are the data provided by subjects who observe, record, and report their own behavior? Second, are self-monitoring procedures reactive; that is, do they significantly alter the monitored behavior? Third, if self-monitoring procedures are reactive, might they be used to foster therapeutic change? The fact that the evidence on these questions is inconclusive (see Kazdin, 1974b) suggests that perhaps investigators have been viewing the entire self-monitoring problem too simplistically. Instead of asking "Is self-monitoring reactive?" or "Is self-monitoring therapeutic?" perhaps investigators should be asking "What effects occur, under what conditions, in what behaviors, with what subjects, as a function of what specific self-monitoring procedures?" [1]

The utility of such an analytic approach was demonstrated in a recent series of three self-monitoring experiments by Kazdin (1974a). The experiments, conducted under controlled laboratory conditions, used a Taffel-type sentence-construction task. The frequency of sentences starting with "I" or "we" was the target behavior for self-monitoring and the dependent variable. In the first experiment, Kazdin systematically varied the perceived social desirability of the target behavior and found that the direction of self-monitoring effects was a function of the behavior's valence. A positive valence led to an increase, a negative valence led to a decrease, and the absence of a specific valence led to no real change in the target behavior. These valence effects reportedly occurred even without self-monitoring but were more pronounced when coupled with self-monitoring. The second experiment showed that providing subjects with a performance standard tended to enhance the relative effects of self-monitoring and response valence. The study also suggested that being monitored by someone else was as reactive as self-monitoring. Finally, the third experiment demonstrated that subjects who observed their target behavior being tabulated on a digital counter showed stronger self-monitoring effects than subjects who did not receive such visual feedback.

The present study, which was conducted entirely independently of Kazdin's, took a

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[1] We are indebted to Gordon Paul, who originally formulated essentially this same heuristically valuable question in connection with psychotherapy outcome research.

similar analytic approach toward examining some of the same critical questions. First, it sought to reconcile the seemingly discrepant findings of previous studies regarding the direction of self-monitoring effects (e.g., McFall, 1970; McFall & Hammen, 1971). It tested the hypothesis that the direction of change is a function of the value attributed to the target behavior by the subject within the monitoring context (see Gottman & McFall, 1972). Second, the study attempted to partition the effects of the target behavior's perceived value from the effects of the self-monitoring act per se. It was hypothesized that both value and self-monitoring are necessary and that neither alone is sufficient to produce significant changes in target behavior. Third, based on the assumption that there is something especially reactive about the self-monitoring act per se, it was hypothesized that *self*-monitoring would produce greater changes in the target behavior than would *experimenter*-monitoring and that a combination of self- and experimenter-monitoring would be at least as reactive as self-monitoring, if not more so. Fourth, based on the assumption that it is the self-monitoring act per se that is reactive, it was hypothesized that multiple reports of the self-monitoring act would be associated with a greater magnitude of change in the target behavior than would a single report of the self-monitoring act. Finally, it was hypothesized that self-monitoring effects are specific to the self-monitoring act itself and are not the result of subjects merely attending to the target behavior.

There were two important differences between this study and Kazdin's studies. One was in the choice of target behaviors. The eyeblink response was used in this study because it satisfies several stringent criteria. It occurs with regularity and reasonable frequency; it is a neutral response that can be given positive or negative value via instructions; it is a discrete, easily counted behavior that can be monitored unobtrusively; and it usually occurs without the subject's awareness, although the subject can exercise some control over it. The second difference was in the choice of experimental designs. Among other things the present design fostered improved separation of the effects of the independent variables.

Method

Subjects and Design

Eighty undergraduates (38 women, 42 men) served as subjects. They were volunteers from introductory psychology who received "experimental points" for participating. There were 10 experimental conditions, with 8 subjects in each. The sexual composition of the groups was comparable. All subjects were seen individually for a single 30-minute session. Subjects' eyeblinks were recorded over four experimental periods of 5 minutes each: baseline, value induction, monitoring, and return to base.

The experimental design is summarized in Figure 1. Six of the 10 experimental conditions were used in a 3×2 design to assess the effects of 3 levels of value (positive, neutral, and negative) and 2 levels of monitoring (self-monitoring and no monitoring) on eyeblink rates. Two of the remaining groups received the positive-value instructions but experienced either experimenter-monitoring or a combination of experimenter- and self-monitoring; these groups assessed the relative reactivity of differing monitoring sources. Another group received positive-value and self-monitoring instructions but was told to report their eyeblink count for each of 10 consecutive 30-sec intervals instead of reporting only one count at the end of a 5-min. period; this permitted an assessment of the effects of multiple versus single self-monitoring reporting. Finally, one control group heard no mention of eyeblinks and received no monitoring instructions; all instructional references to eyeblinks were replaced by references to respiration.

Procedure

The subject was told that the study's purpose was to gather normative physiological data. The subject's height, weight, and sleep pattern were recorded, and four electrodes were attached to the subject, along with a bogus rationale for each: on the right wrist "to record heart rate"; over the left eyebrow "to record frontal lobe electroencephalogram"; on the left hand "to record palmar sweat"; and on the left side of the nose "as a neutral point." The Beckman electrodes were adhered with paper double-faced adhesive collars after cleansing skin surfaces with alcohol and applying Beckman conducting paste. Actually, only two electrodes—over the eyebrow and on the nose—were active. They provided continuous eyeblink records on a Grass Model 5 polygraph, calibrated to a .2 mV/cm pen deflection with a .8-sec time constant. A ground clip was affixed to the subject's ear. After assuring the subject that there would be no shocks, the experimenter adjourned to an adjacent control room.

Experimental treatments were presented entirely via prerecorded audiotapes over a loudspeaker. Tapes for the 10 experimental conditions were equated

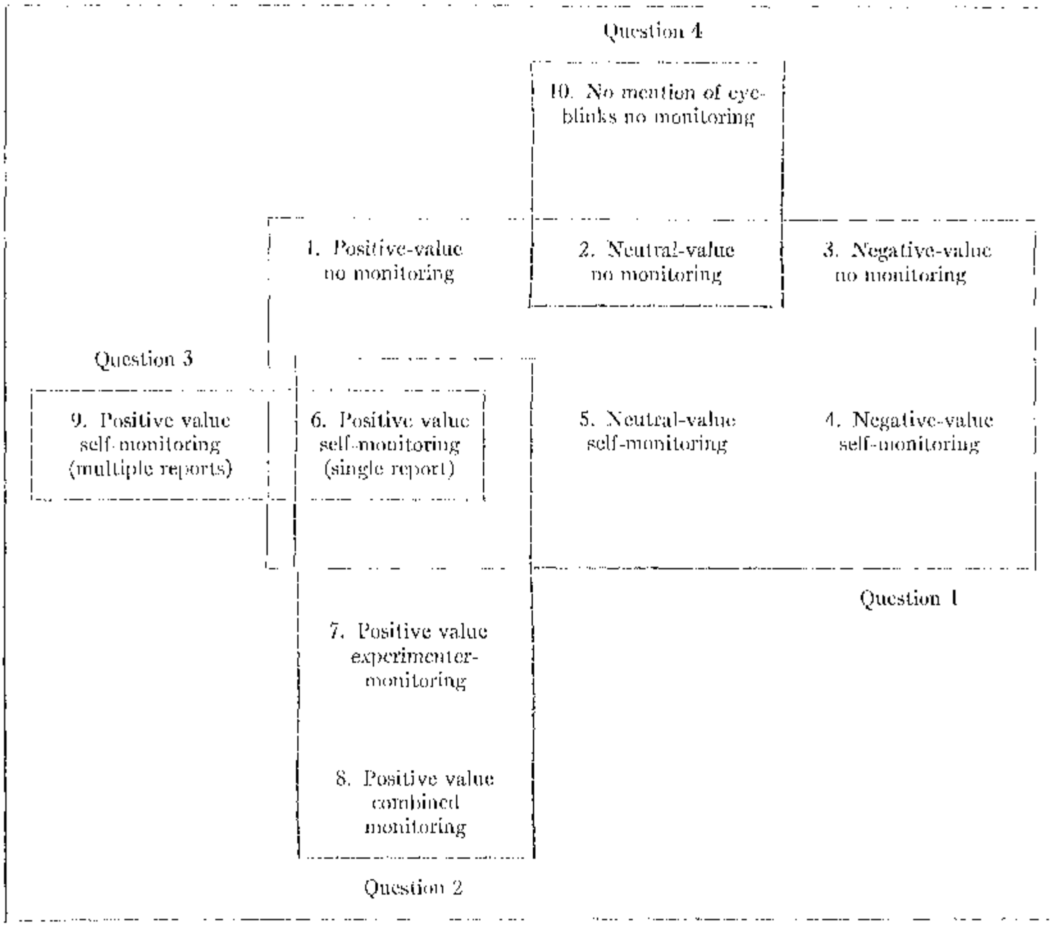

FIGURE 1. Ten experimental conditions and their relevance to four experimental questions. (1 = relationship among value of target behavior, self-monitoring, and reactivity; 2 = relative reactivity of different monitoring sources; 3 = relative effects of frequent versus infrequent reporting; and 4 = effects of merely having one's attention drawn to eyeblinks.)

for time and were identified by a code that kept the experimenter partially "blind." Instructions were recorded on one channel of a stereo tape so that only the subject could hear them; the second channel, audible only to the experimenter, provided only cue tones to signal the beginning and end of periods so that the experimenter could mark these on the polygraph record.

Baseline. These instructions were identical for all conditions. Subjects were told that the procedure involved assessing the physiological responses of normal subjects; that it would take about 20 minutes; and that they should remain awake, alert, and their "normal physiological selves" throughout.

Value-induction period. After 5 minutes of unobtrusive baseline recording of eyeblinks, subjects received instructions designed to attribute positive, neutral, negative, or no value to the eyeblink response. On the pretext of illustrating the importance of gathering good normative data on physiological responses, subjects in the positive-value condition were told that recent research has shown frequent eyeblinking to be characteristic of persons who have high IQs, who tend to be accident-free drivers, and who tend to be happily married. Subjects in the negative-value condition were told that frequent eyeblinking to be characteristic of persons who have proneness, and unhappy marriages. Neutral-value subjects heard eyeblinks described only as a useful dependent variable in psychological learning research with little real relevance to anything. Subjects in the no-value condition received the neutral-value message but with all eyeblink references replaced by respiration references.

Monitoring period. After another 5 minutes of unobtrusive eyeblink recording, subjects received one of four monitoring instructions. Subjects in the no-monitoring conditions merely were told more about the expected contributions of the study, such as the value of readily available normative data. Subjects in the self-monitoring conditions were asked to assist in collecting additional normative data by counting their own eyeblinks, either for 5 min. (in the single-report conditions) or for each of 10 30-sec periods (in the multiple-report condition). They were to start and stop their counting according to a signal bell and report their total count aloud upon stopping. Finally, they were told: "Remember, because we're collecting normative data, please continue to blink at your normal rate." Subjects in the *experimenter*-monitoring condition received nearly identical instructions, except that instead of counting their own eyeblinks they were told that the experimenter would be counting them. They were told, "To do that, we'll have to open the curtain so we can see through the one-way mirror." From the adjoining room, the experimenter then opened the curtains that had previously hidden a one-way window from the subject's view. Subjects in the *combined*-monitoring condition received a combination of the self- and experimenter-monitoring instructions. It was explained that the subject's counting was intended as a reliability check on the experimenter's counting.

Return-to-base period. After the 5-minute monitoring period, all subjects were told: "Okay. Your data's coming in very well. Just continue to remain alert, awake, and comfortable, and we'll be finished in about 5 minutes." If the curtains had been open, they were closed again at this point. Eyeblinks continued to be recorded unobtrusively for another 5 minutes. Then the experimenter announced the end of the study and rejoined the subject.

Debriefing. Because control procedures had kept the experimenter from actually hearing subjects during the experiment, while removing the electrodes the experimenter asked self-monitoring subjects "How many eyeblinks did you count, again?" and recorded their reply on their data sheets. All subjects were then asked to read a written statement on the importance of knowing whether they believed they were being deceived and were asked to indicate whether they believed this experiment involved deception. Subjects were told they would receive a bonus of 2 "experimental points" if they guessed correctly. Finally, subjects were asked to read a 1-page explanation of the study's true nature and purpose.

Results

Polygraph eyeblink records were scored "blindly" twice: First, all records within each treatment period were scored; then each subject's record was scored across all periods. The results of these two scoring methods were very highly correlated ($r = .99$). The mean blink rate at baseline was 16.00 blinks per minute for men ($SD = 8.02$) and 14.80 blinks per minute for women ($SD = 9.80$), with a range of from 2.4 to 38.8 blinks per minute.

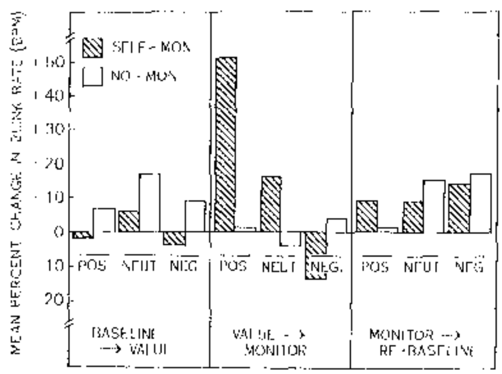

Figure 2. Mean percentage of change in blink rate over experimental periods as a function of positive (pos.), neutral (neut.), or negative (neg.) value being attributed to the behavior and the presence or absence of self-monitoring. (Abbreviated: bpm = blinks per minute; mon. = monitoring.)

These data are consistent with norms reported in the eyeblink literature (e.g., Gregory, 1952). Data for one subject in the positive-value experimenter-monitoring condition were lost due to an equipment failure.

Effects of value induction and self-monitoring. A preliminary analysis of variance performed on the baseline blink rates of the six groups involved in the 3×2 portion of the design examining Value Induction $\times$ Self-Monitoring effects indicated that the groups were equivalent prior to the introduction of the experimental treatments ($p > .20$). Furthermore, an analysis of the relationship between subjects' baseline blink rates and their percentage of change from the baseline to the value-induction period revealed that the percentage change score was relatively free from "initial level" effects. Thus, subsequent analyses of treatment effects were performed on percentage change scores from one experimental period to the next. These data are summarized in Figure 2.

The percentage change scores between the baseline and value-induction periods indicated that the three different values attributed to eyeblinks did not have a significant independent effect on blink rates, Kruskal-Wallace one-way analysis of variance, $H(2) = 2.53$, $p > .20$. As predicted, merely informing subjects that frequent blinking has positive, neutral, or negative psychological implications

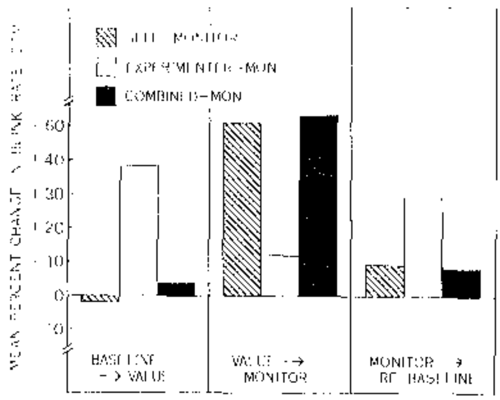

FIGURE 3. Mean percentage of change in blink rate over experimental periods when positively valued target behavior is monitored by one of three different sources: self, experimenter, or both combined. (Abbreviated: bpm = blinks per minute; mon. = monitoring.)

was not significantly reactive in and of itself. However, an analysis of percentage of change in blink rates between the value-induction and monitoring periods revealed a tendency for value induction and self-monitoring to exert significant interactive effects. The positive-value self-monitoring group differed from the positive-value no-monitoring group (Mann-Whitney test, one-tailed $U = 13$, $p = .025$); self-monitoring instructions produced a substantial increase in blinking relative to no-monitoring instructions. A similar comparison between the two negative-value groups just fell short of achieving significance ($U = 17$, $p = .065$, one-tailed); self-monitoring tended to produce a decrease in blink rate, relative to no monitoring. Finally, a comparison between the positive- and negative-value self-monitoring groups yielded significant results ($U = 14$, $p = .032$, one-tailed). A comparison between the two neutral-value groups showed no significant differences as a function of their differential monitoring instructions ($U = 31$, $p = .96$). Comparison of percentage change scores between the monitoring and return-to-base periods failed to show any significant differences associated with the three value inductions, the two monitoring instructions, or the Value × Monitoring interaction (all ps $>$ .60).

Examination of within-group changes over experimental periods revealed that the only changes even approaching significance were in those conditions in which changes had been predicted. The positive-value self-monitoring group tended to increase their blink rates from the value period to the monitoring period (Wilcoxon matched-pairs signed-ranks test, one-tailed $T = 6$, $p = .045$), whereas the negative-value self-monitoring group showed a nearly significant tendency to decrease their blink rates between the same two periods ($T = 7$, $p = .065$).

In summary, then, value-induction instructions alone, in the absence of self-monitoring instructions, showed no evidence of reactivity. Similarly, self-monitoring instructions alone, in the absence of either a positive or negative value being attributed to eyeblinks, were not reactive. However, when combined with a positive or negative value, self-monitoring seemed to be reactive, with the direction of the effect being determined by the particular value with which it was associated.

Effects of monitoring source. Figure 3 summarizes the percentage change data for the three positive-value conditions associated with the different monitoring sources. The self-monitoring, experimenter-monitoring, and combined-monitoring groups had equivalent blink rates at baseline, $H(2) = .65$, $p > .50$. Over the different experimental periods, their percentage change scores continued to show no significant group differences (baseline to value period: $H = 4.43$, $p > .10$; value to monitor period: $H = 3.09$, $p > .20$; monitor to rebase period: $H = .02$, $p > .98$). Although the observed differences fell short of statistical significance, the magnitude of some changes was considerable and deserves further examination. The experimenter-monitoring group, for example, showed a sizable but inexplicable change between the baseline and value periods. The other two groups, in contrast, changed considerably between the value and monitor periods.

Inspection of group means in Figure 3 reveals that the patterns for the self-monitoring and combined-monitoring groups are very similar. The experimenter-monitoring group's pattern, on the other hand, not only looks different but also defies explanation. The large, nearly significant, increase during the value-induction period occurred *prior* to the introduction of the differential monitoring instructions at a point at which all three groups still had experienced identical treatments. Following the introduction of the experimental manipulation, however, the experimenter-monitoring group showed little evidence of reactivity, whereas the other two groups did. Analyses of within-group changes indicated that both the self-monitoring and combined-monitoring groups increased their blink rates considerably during the monitoring period ($T = 6$, $p = .045$, and $T = 7$, $p = .065$, one-tailed, respectively), whereas the experimenter-monitoring group did not ($T = 12$, $p > .20$).

Effect of multiple versus single self-monitoring reports. During baseline, the positive-value self-monitoring condition that involved multiple reporting (10 reports over a 5-minute period) was equivalent to the positive-value self-monitoring condition that involved only a single report over the same period ($U = 27$, $p = .64$). Analyses of the percentage change scores, depicted in Figure 4, revealed that no significant group differences were associated with either the value-induction or return-to-base periods ($U = 22$, $p = .32$, and $U = 26$, $p = .57$, respectively). During the monitoring period, however, the groups tended to differ ($U = 14$, $p = .064$). The direction of the observed difference was *contrary* to predictions, with subjects in the multiple-report condition actually showing a tendency to *decrease* their blink rate ($T = 7$, $p = .13$) and single-report subjects showing a tendency to *increase* theirs ($T = 6$, $p = .09$).[2]

Other analyses. Also depicted in Figure 4 are the percentage change scores for the remaining two experimental groups: the neutral-value no-monitoring group and the no-value no-monitoring group. These groups were compared to examine the possibility that merely attending to neutrally valued eyeblinks, without specifically monitoring them, may be reactive, relative to a condition in which eyeblinks are never even mentioned (i.e., where "respiration" is substituted for all "blink" references). There were no significant differences in the baseline, value-induction, and return-to-baseline periods ($U = 22$, 29, and 20, respectively, all $ps > .20$). Surprisingly, the groups were different in the monitoring period ($U = 13$, $p = .05$), with the no-value no-monitoring group significantly increasing their blink rate ($T = 1$, $p < .02$) and the other group showing only a slight decrease ($T = 12$, $p > .20$).

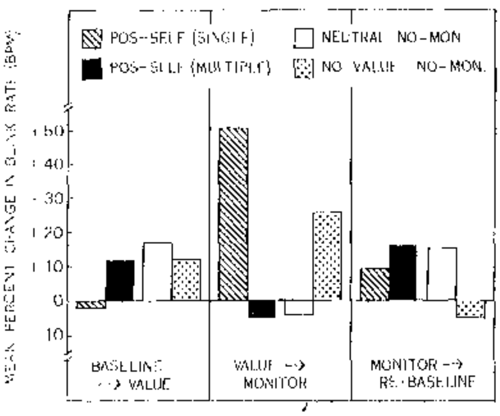

FIGURE 4. Mean percentage of change in blink rate over experimental periods as a function of frequent versus infrequent self-monitoring reports and as a function of merely attending to eyeblinks without explicitly monitoring (mon.) them. (Abbreviated: bpm = blinks per minute; pos = positive.)

This unexpected finding deserves further study. It is possible that merely drawing subjects' attention to their eyeblinks tends to stifle blink-rate increases that might otherwise occur as a function of fatigue, boredom, or similar nonspecific factors. On the other hand, it is possible that the increased blink rate of the no-value no-monitoring group may have been mediated by unanticipated effects of references to respiration in that group's instructions.

A minute-by-minute breakdown of eyeblink behavior over the four experimental periods was plotted for groups that had shown evidence of reactive monitoring effects (i.e., negative-value self-monitoring; positive-value self-monitoring; positive-value combined-monitoring). With positively valued behaviors, there

[2] These nonparametric analyses compared the numbers of subjects in each group whose percentage change scores were either in a positive or negative direction. Magnitude of change was not a factor; hence, the apparent change, seen in Figure 3, is not perfectly related to the statistical results.

was a tendency for most of the reactivity to occur in the latter half of the monitoring period; with negatively valued behaviors, however, the reactivity was more pronounced in the first half of the period. This pattern is similar to one previously noted by Gottman and McFall (1972).

As a partial test of the accuracy of subjects' reports of self-monitored data, the polygraph eyeblink data for self-monitoring subjects were correlated with the self-report eyeblink data obtained and recorded at the time of debriefing. The resulting correlation of .91 indicates that subjects were reliable observers and reporters of their own eyeblinks.

Finally, analysis of subjects' responses to the "deception" questionnaire administered during debriefing revealed that 41% of the subjects guessed that the study had involved some deception. Subjects in the monitoring groups were significantly more likely than subjects in the no-monitoring groups to feel that there had been some deception, $\chi^2(2) = 4.98$, $p < .025$. Within those monitoring groups in which blink-rate changes had been predicted, it was found that subjects guessing "deception" were three times more likely to change in the predicted direction; in contrast, subjects guessing "no deception" were about evenly divided in terms of whether they changed in the predicted direction. For all subjects who changed in the predicted direction, there was no significant relationship between the magnitude of change and their tendency to guess that there had been some deception.

Discussion

This study provided evidence that neither the value of the target behavior nor self-monitoring alone is sufficient to produce a significant reactive effect. The combination of the two, however, does seem to be reactive, with the direction of the effect being a function of the target behavior's value. Value also seems to be differentially related to the magnitude of the observed effects; in this study, the decreased blink rate of the negative-value self-monitoring group was less pronounced than the increased blink rate of the positive-value self-monitoring group. Previous studies also have found that response increases are more readily produced than response decreases with self-monitoring procedures (e.g., Gottman & McFall, 1972; McFall, 1970). This difference deserves further research attention.

With the exception of the inexplicable monitoring-period change evidenced by the control group in which monitoring and eyeblinks were never even mentioned, the only groups showing anything approaching reactive effects were those in which such effects had been predicted (i.e., the monitoring groups with positive and negative values). The positive-value experimenter-monitoring group failed to show any sign of reactive effects—another outcome consistent with predictions—although the difference between this group and the self- and combined-monitoring groups fell short of significance. Also as predicted, the groups that did show reactive effects did so only in the monitoring period. Except for the multiple-report self-monitoring group, which showed effects in a direction opposite to expectations, the directional pattern of results was consistent with the experimental hypotheses. The unexpected effects of multiple reports deserve further study.

The experimental results corroborated Kazdin's (1974a) findings regarding the role of the target behavior's valence in determining the direction of self-monitoring effects. The fact that this corroborating evidence was found using a different target response and experimental design suggests that the obtained relationship may be a very general one. In other important respects, however, this study's results conflicted with Kazdin's. For example, value instructions alone did not have reactive effects, whereas in Kazdin's study they reportedly did. One possible reason for this difference is that Kazdin's design may not have provided an adequate test of the isolated effects of value instructions; his subjects were aware that their target behavior was public and was being recorded, even in those conditions in which they were not instructed to keep a formal count of it themselves. Another discrepancy was in the effects of having someone else monitor the subjects' behavior. Kazdin (1974a) reported that experimenter-monitoring was reactive, whereas it was not found to be so in this study. Again, on closer inspection it seems that Kazdin may not have adequately assessed the isolated effects of monitoring by the experimenter. His condition was similar to the *combined*-monitoring condition in the present study; his experimenter monitored the target behavior by operating a digital counter that was visible to the subject during the task, thus allowing the subject to keep track too.

The results of this study do not provide an adequate basis either for choosing among the available theoretical explanations of self-monitoring effects (e.g., Kazdin, 1974b) or for developing a new conceptualization of the underlying process. The study represents only a beginning in the search for the determinants of self-monitoring effects. Despite the need for far more research, however, there seem to be at least two general principles emerging from the research that have implications for the use of self-monitoring procedures to foster therapeutic change. First, the subject's perceived value of the target response seems to determine the direction of change produced by self-monitoring procedures. Second, there is growing evidence that it is easier for self-monitoring procedures to produce increases than decreases in target behaviors. In combination, these findings suggest that the therapist interested in using self-monitoring procedures to effect behavioral changes should make certain that the target behavior being monitored has highly positive value to the client.

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