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BRIEF NOTE

The Role of Awareness in Reducing Nail-biting Behavior

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To determine the role of nonspecific awareness factors in self-monitoring of nail-biting and incentives, 40 subjects were randomly divided into five treatment groups: self-monitoring, positive incentive, negative incentive, nail measure alone, and minimal contact. Subjects were seen individually for 6 weeks and records of nail length and self-monitored biting responses were kept. While all treatments resulted in a decrease in biting frequency and an increase in nail length, subjects in the minimal contact control group experienced the smallest changes. There were no differences between basic self-monitoring and self-monitoring plus incentive subjects. At follow-up, there were no group differences in nail length, and subjects reported increased awareness of biting compared to pretreatment. These results suggested that a treatment package consisting of self-monitoring plus regularly scheduled nail measurements is effective in increasing awareness for control of nail-biting.

Vargas and Adesso (1976) evaluated the effectiveness of three modes of aversion therapy, with and without self-monitoring, for the suppression of nail-biting. All treatments reduced nail-biting, with self-monitoring subjects exhibiting significantly greater increases in nail growth than non-self-monitoring subjects. This suggested that reductions in nail-biting were at least partially attributable to nonspecific factors independent of the aversive procedures administered. As London (1969) has suggested, awareness of the target behavior is a necessary prerequisite to controlling it. Two nonspecific factors seemed related to increases in awareness of the behavior and, therefore, worthy of further investigation. First, participation in the study may have facilitated control over biting simply by increasing awareness of it. Despite procedural differences in the treatments, each did serve to focus attention upon nail-biting behavior. Second, having subjects committed to regularly scheduled nail-measuring sessions could have inadvertently increased attention to nail length, thereby influencing subsequent biting behavior.

Two experimental questions were investigated: (1) Are the treatment

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outcomes achieved with self-monitoring alone distinguishable from those produced by nonspecific awareness factors? (2) Can the outcomes produced with self-monitoring alone be enhanced by the addition of incentives to self-monitoring? To answer the first question, the self-monitoring subjects were compared with subjects in two control groups. A "minimal contact" group serve as a control for mere participation, and a "nail measure alone" group controlled for the potentially reactive effects of having one's nails measured regularly. The minimal contact group was expected to achieve results inferior to those of the self-monitoring treatment while the nail measure alone group would achieve comparable results.

An attempt was also made to determine if the effects on nail growth achieved with self-monitoring alone could be enhanced by adding an incentive to self-monitoring. The basic self-monitoring technique was evaluated against two types of incentive conditions for suppression of nail-biting. The three techniques were similar in requiring daily self-monitoring of nail-biting. However, subjects in the self-monitoring alone group were neither rewarded nor punished for changes in nail length over each preceding week of treatment, while individuals in the "positive" and "negative" incentive groups did receive such consequation. The incentive selected was experimental credit, as it was a requirement for satisfactory completion of the course from which subjects were recruited. Hence, while self-monitoring and control subjects were assured of receiving credits for participation, the awarding of credits to subjects in the incentive groups was contingent upon weekly control of their nail-biting. Under these circumstances, it was predicted that subjects in both incentive conditions would achieve greater increases in nail growth than those in the self-monitoring alone condition.

METHOD

Subjects

Fourteen males and twenty-six females, with a mean age of 19.75 years and an average of 11.6 years of nail-biting, volunteered. Eight subjects were randomly assigned to each of five groups: self-monitoring, positive incentive, negative incentive, nail measure alone, and minimal contact. All subjects remained active participants throughout the duration of the study, with two subjects in the negative incentive group each missing one session and one subject in each of the control groups and one in the negative incentive group failing to attend the follow-up session.

Procedure

Each subject met individually with the experimenter once weekly over a period of 6 weeks. During the first session, prior to treatment, each subject completed a nail-biting questionnaire and had his/her nails measured. Nail length was measured from the base of the nail at the point where it separated from the cuticle to the centermost portion of the top of the nail, in sixty-fourths of an inch. The individual lengths of the 10 fingernails were then summed to yield a composite nail-length measurement for each subject. During this session subjects were also instructed to self-monitor the number of separate occasions each day over the following week that they engaged in nail-biting to obtain a baseline. A nail-biting response included not only those occasions in which a biting response was actually performed, but all instances in which a finger was inserted between the lips in such a way that contact between a fingernail and one or more teeth was established. Each subject was given a chart listing the days of the week on which the total for each day could be entered. Every time nail-biting behavior occurred, a mark was to be recorded on 3 × 5 index cards. At the end of the day, these marks were to be summed and the total recorded on the chart. Identical charts were completed for 5 weeks for subjects in self-monitoring groups.

Treatment was formally initiated during the second week of the study after baseline recording was completed. Subjects also attended four treatment sessions plus a final nail-measuring session, yielding a total of six nail measurements. At this first treatment session, subjects received instructions appropriate to their treatment condition and were told to refrain from clipping or filing their nails for the duration of the experiment. Four months after the final nail-measurement session, an attempt was made to contact all subjects by a second experimenter, blind to the original treatment conditions, for follow-up nail measurements.

Treatment conditions

Self-monitoring condition. Subjects were told to continue monitoring their nail-biting throughout the 4 weeks of treatment. At each session, subjects exchanged their recording materials of the previous week for new ones and nail measurements were taken. If all inspection appointments were kept, subjects in this condition received four experimental credits irrespective of changes in nail length.

Positive incentive condition. The same self-monitoring procedure was employed for subjects in the present group. However, for these subjects awarding of experimental credits was contingent upon measurable increases in nail length. At each of the four nail-measuring sessions, subjects either were awarded one credit for increases in nail length over the previous week or forfeited the credit for no changes or decreases in nail length. Hence, it was possible for subjects in this group to earn as many as four or as few as zero credits during treatment.

Negative incentive condition. Subjects assigned to this condition also followed the self-monitoring procedure described above. In addition, they were informed at the start of treatment that they possessed four experimental credits. Retention of these credits was contingent upon both their attendance and their ability to abstain from nail-biting. At each session, measurable increases in nail length over the previous week would enable subjects to avoid the loss of a credit, whereas no changes or decreases in nail length resulted in deduction of one experimental credit. Hence these subjects could also earn from zero to four experimental credits during the course of treatment.

Nail measure alone control. Subjects in this condition ceased monitoring their biting after the initial week of the experiment (baseline). They simply reported to the experimenter once each week to have their nails measured. Provided all inspection appointments were kept, these individuals received four experimental credits.

Minimal contact control. Those assigned to this condition had no contact with the experimenter throughout the treatment period. After nail measures had been obtained before the start of, and at the conclusion of, the baseline recording week, each of the subjects was instructed not to clip his/her nails until further notice from the experimenter. They were not contacted until the final nail-measuring session, when their nails were again measured and they were awarded their four experimental credits.

RESULTS

Self-Monitoring Data

The mean numbers of responses recorded by the self-monitoring, positive, and negative incentive groups during each of the 5 weeks of treatment were 55.7, 31.5, 27.4, 25.2, and 22.3, respectively. A 3 (groups) × 5 (weeks) split-plot factorial design (Kirk, 1968) yielded only a main effect for time ($p < .01$), indicating a decrease in the number of recorded occasions of nail-biting during the course of treatment. Tukey's test for pairwise comparisons revealed that the mean number of nail-biting responses recorded during baseline was significantly greater than that recorded during each successive week ($p < .01$). However, the number of responses recorded during Weeks 2 through 5 did not differ.

Nail-Length Data

Table 1 presents mean nail lengths and standard deviations for the five treatment groups across the various treatment intervals. As subjects in the minimal contact control group had their nails measured only three times during the course of treatment (prebaseline, postbaseline, and posttreatment), it was possible to compare nail lengths for all five groups only at these three treatment intervals. A 5 (treatments) × 3 (sessions) split-plot factorial design revealed a significant Treatment Conditions × Time interaction, $F\,(8, 70) = 6.6, p < .01$, which qualified a main effect for time, $F\,(2, 70) = 74.9$, $p < .01$. Analysis of the simple effects of treatment conditions at each of the three levels of time suggested that the interaction was due to the difference among treatment means at the time of the final nail-measuring session. Using Tukey's test to compare the mean nail lengths for the five treatment groups at the final session, minimal contact group differed significantly from the self-monitoring ($p < .01$) and positive incentive ($p < .01$) groups and differed marginally from the negative incentive group ($p < .05$). There were no other significant differences.

As all subjects, except those in the minimal contact condition, attended weekly nail-measuring sessions, it was possible to determine if the reac-

TABLE 1

MEAN NAIL LENGTHS FOR FIVE GROUPS ACROSS TREATMENT INTERVALS[a]

Treatment	Pre-baseline	Baseline	Treatment sessions				Follow-up
			1	2	3	4	
Self-monitoring	122.6	132.0	139.4	145.2	145.6	149.9	158.3
	22.4	23.8	24.4	26.2	28.2	31.1	31.8
Positive incentive	120.5	129.0	140.1	143.1	143.9	152.1	145.7
	15.5	16.2	14.2	15.5	19.4	21.2	15.1
Negative incentive	106.7	114.0	124.7	131.6	136.9	141.7	158.3[b]
	14.4	16.7	18.3	20.1	24.8	24.2	40.8
Nail measurement	108.5	118.6	121.4	126.0	126.5	130.1	148.1[b]
Alone	19.2	20.6	22.1	23.8	25.5	27.1	36.7
Minimal contact	106.2	115.9	—[c]	—[c]	—[c]	107.7	121.7[b]
	23.1	23.1				24.5	15.7

[a] These measurements represent the sum of all 10 fingernails presented to the nearest sixty-fourth of an inch. The first cell entry is the mean, the second is the standard deviation.

[b] $N = 8$ for all cells except these, where $N = 7$.

[c] No measurements were taken for this group for these sessions.

tive effects of the remaining four treatments differed from one another across treatment. A 4 (treatments) × 6 (nail-measuring sessions) split-plot factorial design used to analyze these data yielded only a main effect for time, F (28, 140) = 66.3, $p < .01$, indicating a significant increase in nail length over successive weeks. Comparisons of mean nail lengths for each session with Tukey's test indicated that: (1) Mean nail lengths of sessions 2 through 6 were all greater than that of the initial nail-measuring session ($p < .01$); (2) mean nail lengths of sessions 3 through 6 were all greater than that of session 2 ($p < .01$); (3) mean nail lengths of sessions 5 and 6 were greater than that of session 3 ($p < .01$); and (4) the mean nail length of session 6 was greater than that of session 4 ($p < .01$).

Follow-up Data

Four months after the last treatment session nail measurements were obtained from 37 of the 40 subjects. A one-way analysis of variance indicated no differences among the treatment conditions, F (4, 32) = 1.8. To determine if there had been any decreases in nail length since the conclusion of treatment, t tests for correlated measures were computed comparing follow-up with final treatment session nail lengths. The results revealed that, while none of the groups had decreased in nail length, the nail measure alone group had a marginal increase ($p < .05$).

Finally, of the 28 individuals (75.6% of those contacted for follow-up) who reported that they still bit their nails at follow-up, 42.8% claimed to be always aware of biting, 46.4% were sometimes aware, and 10.8% usually felt unaware. A χ^2 analysis comparing these percentages to pre-treatment awareness percentages (i.e., 15% always aware, 57.5% sometimes aware, 27.5% usually unaware) indicated a marginal increase in awareness of biting χ^2 (2) = 7.53, $p < .05$.

DISCUSSION

The primary concern of this study was to assess the role of nonspecific awareness factors in the treatment outcomes achieved through self-monitoring of nail-biting. Such an assessment was made possible by incorporating controls for both participation in a nail-biting study and attendance at regularly scheduled nail-measuring sessions. Although subjects in both the minimal contact and nail measure alone control groups achieved the smallest increases in nail growth over the duration of the study, the increases attained by subjects in the nail measure alone group were not different from those of subjects in the self-monitoring conditions but the increases of subjects in the minimal contact condition were. Thus, it appears that regular attendance at scheduled nail-measuring sessions plays a significant role in the effectiveness of the self-monitoring treatment beyond mere participation in a nail-biting reduction study.

Nevertheless, it would be erroneous to assert that the increases in nail length experienced by self-monitoring subjects were due entirely to a commitment to attend nail-measuring sessions. While nail measure alone control subjects did not differ significantly from either the self-monitoring or minimal contact control subjects, the self-monitoring groups did differ from the minimal contact subjects. It seems that there was a relation between the amount of attention to nail-biting that a treatment necessitated and increases in nail length achieved through the treatment. Self-monitoring and nail measurement afforded subjects more direct and consistent opportunities to focus attention upon their biting and nail length, whereas the minimal contact treatment provided few such opportunities.

It is also of interest to note that the number of biting responses reported by self-monitoring subjects decreased immediately after the baseline week but did not decrease further during the subsequent weeks of treatment. It is conceivable that self-monitoring produces an initial decrement in biting which must then be followed up with additional procedures such as regularly scheduled nail measurements. Unfortunately, the design employed in the present study did not allow a clear separation of the self-monitoring and attendance variables as all subjects self-monitored biting during baseline and self-monitoring subjects attended measurement sessions. In future research, it would seem advisable to employ a much longer baseline so that reactive self-monitoring effects could stabilize.

A second issue of concern in this study was a determination of the effect of supplementing basic self-monitoring with incentives. Comparison of the basic self-monitoring technique to each of the incentive conditions indicated no differential effectiveness. This finding, while consistent with the results of Horan, Hoffman, and Macri (1974) and Stephan and Koenig (1970), may simply be indicative of the inadequacy of the incentives employed. It is entirely possible that, in the present study, gaining or avoiding the loss of experimental credits did not provide a sufficient incentive for subjects to suppress their nail-biting to the extent that significant differences might have emerged between treatments.

The 4-month follow-up indicated that, although the nail measure alone control group experienced a slight increase in nail length since the final treatment session, there were no differences in nail length among the five groups. There was also an increase in self-reported awareness of biting from pretreatment. These results need to be qualified by two other findings. First, the average per finger nail length increase from prebaseline to follow-up was 0.0523 in., a rather modest average gain of about 30%. Second, of the 37 individuals who returned for follow-up 28, or 75.6%, reported biting their nails to some extent. While this percentage is comparable to that obtained by Vargas and Adesso (1976), who found that 70.8% of the follow-up subjects were still biting their nails, it is not a very impressive treatment outcome. Thus, although the self-monitoring plus regular nail-measurement package does seem to be effective for increasing awareness of nail-biting behavior and for bringing about some reduction in nail-biting, it does not seem adequate for total suppression of the behavior. Perhaps, additional components need to be added to this package. From past research, it appears that aversive contingencies (e.g., Horan et al., 1974; Stephen & Koenig, 1970; Vargas & Adesso, 1976), weak incentives, or use of incompatible behaviors (Horan et al., 1974; McNamara, 1972) would not be the components of choice. Some variables that seem worthy of further consideration are: individual differences in responsiveness to various treatments; attacking other dimensions of the behavior; more potent incentives; and substituting alternative behaviors for biting.

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