Self-Administered Behavior Modification to Reduce Nail Biting: Incorporating Simple Technology to Ensure Treatment Integrity

Andrew R. Craig
West Virginia University

ABSTRACT

Habitual behaviors, such as problematic nail biting, are a common target for self-managed behavior-modification programs. The current self-experiment used self-monitoring in conjunction with a self-managed differential-reinforcement procedure for the treatment of problematic nail biting. A simple picture-comparison procedure allowed an independent observer to assist in monitoring treatment progress and outcomes and to ensure treatment integrity. Results provide support that the overall treatment package was successful in decreasing the occurrence of nail biting. Moreover, the treatment-integrity procedure enabled full-day monitoring to take place with limited requirement of a secondary observer.

Keywords: differential reinforcement, nail biting, picture comparison, self-management, self-monitoring, treatment integrity

Habitual nail biting is prevalent in children and adolescents (Christmann & Sommer, 1976) and often persists into adulthood (Ballinger, 1970). Although it does not typically cause impairment, it can be a nuisance and in severe cases may cause health problems such as skin infections or minor tissue damage (Libretto, 1999). Various behavior-modification techniques have been used to decrease nail biting including aversive therapies (Vargas & Adesso, 1976), overcorrection (Barmann, 1979), habit-reversal training (Libretto, 1999), and differential reinforcement of other behavior (DRO; Christensen & Sanders, 1987). An important component of most interventions for nail biting is self-monitoring, because the people biting their nails record their own behavior and self-administer the behavior modification techniques (Peterson, Campris, & Azrin, 1994; Vargas & Adesso, 1976).

Data recorded by the participant through self-monitoring may pose inherent challenges. Of primary concern is that it is easy for individuals to purposefully or incidentally misreport or otherwise inaccurately record data (Roberts

& Neuringer, 1998), which may in turn undermine the evaluation of treatment. To address this challenge, researchers have implemented product-based self-monitoring procedures such as the use of photographs to depict the likely and routine effects of nail biting (Christmann & Sommer, 1976; Ladouceur, 1979; Vargas & Adesso, 1976). For example, Ladouceur (1979) obtained photographs of participants' hands before treatment and at 6- and 12-week follow-ups and made comparisons between the lengths of the participants' nails in order to evaluate treatment efficacy. Similar nail-length comparison procedures are common in the self-monitoring literature for nail biting (e.g., Allen, 1996; Dufrene, Watson, & Kazmerski, 2008), but there are at least two limitations to these procedures. First, the extended time period between observations may not provide sufficiently detailed measures of nail biting. Second, a long period of uninterrupted nail growth might be undesirable, making such measures insufficient for participants who clip their nails or if there is nail breakage.

The current study was a self-experiment that incorporated self-

monitoring with a token-based DRO to decrease the occurrence of the author's nail biting. The self-experiment incorporated a permanent-product based treatment-integrity procedure into the self-monitoring component of the treatment protocol. This procedure was similar to that used by Ladouceur (1979) except the pictures were used to measure both treatment outcomes and integrity. Also, the pictures were taken at more frequent intervals providing a more detailed measure of nail biting. This self-experiment also serves as an example of how the integrity of the intervention and the process of self-monitoring can be enhanced when a contingency-based intervention is largely self-implemented and conducted outside of a clinical or laboratory setting.

Method

Participant and Setting

At the time this research was conducted, I was a 21-year-old student at a Mid-Atlantic University. I had several semesters of experience studying and applying behavior-analytic principles and I wanted to reduce the occurrence of my

nail biting. As described below, I chose to implement a program consisting of self-monitoring and a token-based DRO.

Research Design

An ABAB reversal design (Baer, Wolf, & Risley, 1968) was used to study the effects of the intervention on my nail biting. Treatment consisted of self-monitoring plus DRO. Baseline consisted of self-monitoring only. The study lasted 78 days; monitoring and recording of nail biting occurred on 72 of these days. During the treatment phase, sessions were conducted during weekdays while reversals to baseline were conducted during weekends. The only exception was an extended 9-session baseline that was conducted to ensure that reversal effects were not simply due to changes in behavior between weekdays and weekends.

Data Collection and Response Definition

Throughout baseline and intervention, I recorded each instance of my nail biting by making a tally mark on a piece of notebook paper. Onset of a nail-biting episode was defined as the placement of my fingers at or past the plane of my lips and offset was defined as removal of my fingers from the plane of my lips for a period of longer than 3 s. During the intervention phase, additional data were collected, including the timing of each DRO interval and the time of each token delivery. The total number of occurrences of nail biting per session were graphed for visual analysis. A cohabitant with training in direct observation procedures simultaneously and independently collected data on my nail biting in order to assess interobserver agreement.

Interobserver Agreement and Treatment-Integrity Checks

Once during each of the 72 days, my cohabitant and I simultaneously and independently recorded nail biting during a 1-hr period to assess interobserver agreement. Interobserver agreement for each period was calculated by dividing the smaller recorded number of nail-biting episodes by the larger recorded number of episodes and multiplying by 100%. Mean agreement was calculated by adding the agreement statistic for each period then dividing by the number of observation periods. Mean agreement was 87.5%.

During the intervention phase, a separate procedure was incorporated to ensure DRO integrity and appropriate delivery of token reinforcers. I recorded the time of each occurrence of nail biting and the time of each token reinforcer delivery. Using a cellular camera phone, I took digital photographs (with timestamps) of the condition of my fingernails at the beginning of each DRO interval, after each token delivery, and after each occurrence of nail biting (see Figure 1). During token exchange periods each evening, my cohabitant compared the times of the occurrences of nail biting and of token deliveries to the timestamps of each photograph. If there was no noticeable difference in the condition of my fingernails between the photograph from the beginning of an interval and the photograph

Figure 1. Photographs of the condition of my fingernails from the first day of DRO (top panels) and last day of DRO (bottom panels). Note that timestamps were included in the file information stored within the cellular phone, not on the photographs.

taken upon token delivery, token delivery was recorded as “correct.” Tokens associated with incorrect deliveries would have been removed; incorrect token delivery did not, however, occur during the course of this study. Treatment integrity was determined on all 23 days of treatment and was calculated by dividing the correct number of token deliveries by the total number of token deliveries and multiplying by 100%. Mean treatment integrity was calculated by adding the integrity percentage of each intervention period then dividing by the total number of intervention periods. Mean treatment integrity was 100%.

Procedure

Preference assessment. To identify the most potent reinforcers to use in the DRO schedule, an informal duration-based preference assessment was conducted for 2 days prior to treatment and each observation lasted about 11 hr each day. My cohabitant conducted this assessment by casually monitoring the duration of my engagement with various leisure activities through direct observation. The three activities with which I engaged the most were chosen as the reinforcers; these were playing video games, watching television, and reading nonacademic materials. These activities were restricted during treatment unless delivered as reinforcers.

Baseline. During these periods, I collected data on each occurrence of nail biting. I also had free access to all reinforcers that were to be used in the treatment described below.

DRO. During treatment periods, I implemented a token-based DRO procedure. To set the DRO interval, the mean number of responses per day was divided by the typical duration of each day. The average number of responses during the initial baseline was 16.5 and the duration of a typical day was 16 hr; accordingly, a 1-hr DRO interval was used.

Figure 2. Number of occurrences of nail biting during baseline (BL) and DRO sessions.

A wristwatch with a countdown timer was used to signal the beginning and end of each DRO interval. A token was delivered for intervals during which no nail biting occurred (and a digital photograph of my nails was taken). If nail biting occurred at any point during the DRO interval, the interval was reset without token delivery (and a digital photograph of my nails was taken). Each token was exchangeable for 15 min of leisure activity. Tokens were exchanged with my cohabitant during token exchange periods that commenced upon my returning home each evening and lasted until I retired for the night. During these exchange periods, token reinforcers could still be earned. If not exchanged for reinforcers, tokens expired at the end of the day during which they were accrued.

Results

During the initial baseline component, nail biting was variable but was relatively high throughout each session ($M = 16.5$ episodes per day; Figure 2). When the DRO was initially introduced, nail biting was reduced below baseline levels ($M = 1.8$ episodes per day). When baseline was reintroduced, nail biting increased ($M = 9.5$). When the second DRO component was introduced, nail biting again dropped to counts lower than those of the previous baseline ($M = 0.8$). All subsequent baseline and DRO phases demonstrated the aforementioned pattern (i.e., higher rates during baseline compared to DRO).

Discussion

The overall self-administered behavior-modification package consisting of self-monitoring and DRO was effective for decreasing the occurrence of nail biting. Moreover, the treatment-integrity procedure may have assisted in assuring accurate reporting and adherence to the treatment protocol. This feature addresses a limitation of self-experimentation: Misreporting behavior or otherwise manipulating data collection during treatment periods (e.g., Roberts & Neuringer, 1998) was possibly deterred. Nail biting decreased during treatment and also showed less variability across treatment sessions. These findings suggest that incorporating treatment-integrity checks by means of social support (e.g., a cohabitant, parent, sibling, etc.) may enhance behavior-modification techniques that are implemented largely outside of a clinical or laboratory setting without continuous observation by an outside party.

There are a number of implications of the current study that are noteworthy to practitioners. First, the treatment-integrity procedure only relied on an available and convenient technology (i.e., cellular phone) but effectively maintained the contingencies of the token system and decreased my ability to circumvent treatment contingencies (see Kazdin & Bootzin, 1972). This procedure allowed for treatment to be participant-monitored while providing permanent products

for an independent observer to conduct treatment-integrity checks. The time requirements of the independent observer were minimal, but the procedure still allowed for full-day monitoring. Second, the intervention was conducted in my natural environment. Stokes and Baer (1977) suggest that this feature may lead to generalization of treatment effects across settings. Finally, the treatment-integrity procedure used in this study may have applications in the treatment of other habitual behaviors that may be documented by photograph (e.g., hair pulling, skin picking) and for which a substantial portion of treatment is self-administered (e.g., habit-reversal training).

As described by Roberts and Neuringer (1998), there are additional limitations to self-experimentation, of which at least three directly apply to this study. First, treatment-expectation effects (i.e., a change in behavior due to prior knowledge of the typical effects of treatment contingencies) could have influenced my responding and threatened the validity of these findings. Second, generality across subjects is not readily discernable from the results of self-experimentation. This limitation can be addressed by future research with similar procedures and more self-experimenters with unwanted habits. Third, a number of the procedures used in this study (e.g., the restriction of typically available reinforcers, maintaining data sheets) were rigorous and thus may not be feasible for some. The intrusiveness of the self-modification procedures may decrease a person's motivation and compliance.

There are also methodological limitations of this study that should be addressed. First, reinforcer delivery was not thinned during treatment. Thinning the DRO schedule may have allowed for naturally occurring contingencies to exert control over the behavior (Stokes & Baer, 1977). Anecdotally, after the withdrawal of treatment, nail biting continued at a lower frequency relative to that exhibited prior to treatment. Second, frequency counts were the sole dependent measure. Data regarding duration of nail-biting episodes were not obtained. Finally, abbreviated and regularly scheduled interobserver-agreement periods may have resulted in reactivity to observation. This may have influenced my behavior during these periods. However, despite these limitations, this study demonstrates that self-administered behavior-modification techniques can be successfully designed and implemented to reduce habitual behavior with sufficient knowledge of behavioral principles. In addition, the study demonstrates the use of a novel technique for enhancing treatment integrity, which can easily be used and adapted for self- and clinician-administered behavior-modification programs.

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Author Note

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