

*THERAPIST- AND SELF-MONITORED DRO CONTINGENCIES AS A  
TREATMENT FOR THE SELF-INJURIOUS SKIN PICKING OF A YOUNG  
MAN WITH ASPERGER SYNDROME*

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The use of differential reinforcement of other behavior (DRO) has decreased, at least partially due to the development of less effortful alternative behavioral interventions (e.g., noncontingent reinforcement; Vollmer, Iwata, Zarcone, Smith, & Mazaleski, 1993). The effort associated with DRO contingencies may be lessened by incorporating self-monitoring components in which clients are responsible for the delivery of reinforcers for their own behavior. The current study evaluates the effectiveness of DRO in the treatment of self-injury when implemented first by the therapist and subsequently by the client.

**DESCRIPTORS:** Asperger syndrome, differential reinforcement of other behavior, self-management, skin picking

Differential reinforcement of other behavior (DRO) involves the delivery of a reinforcing stimulus following a period of time in which a target behavior does not occur (i.e., reinforcement of the omission of the behavior; e.g., Cowdery, Iwata, & Pace, 1990). Historically, DRO has been one of the most used reinforcement procedures for the reduction of problem behavior (Lennox, Miltenberger, Spengler, & Erfanian, 1988); however, the published use of these procedures has decreased greatly in recent years (see Lindberg, Iwata, Kahng, & DeLeon, 1999, for an exception).

At least one reason for this decrease may be the effort necessary to implement DRO

contingencies relative to alternative behavioral interventions. DRO requires caregivers or therapists to time interresponse intervals, to continuously observe the occurrence or nonoccurrence of behavior, to deliver reinforcement, and to reset timers when appropriate. By contrast, noncontingent reinforcement may result in similar behavioral reductions, but does not require the continuous monitoring and timing of the target behavior (Vollmer, Iwata, Zarcone, Smith, & Mazaleski, 1993; Vollmer, Marcus, & LeBlanc, 1994).

The use of self-monitoring procedures may be one means of reducing the effort associated with implementing DRO. Self-monitoring involves teaching the client to observe and detect instances of his or her target behavior and to deliver reinforcement according to the arranged contingencies (Ackerman & Shapiro, 1984; Shabani, Wilder, & Flood, 2001). In the case of DRO, clients could be taught to detect instances of their own behavior, to measure their own interresponse intervals and to deliver

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or omit the delivery of reinforcement based on their own performance. In this regard, when implemented correctly, DRO with self-monitoring could then eliminate the need for the most effortful aspects of DRO for caregivers.

The purpose of the current study was to evaluate the effectiveness of DRO for reducing the self-injurious skin picking of a young man who had been diagnosed with Asperger syndrome. Initially, this treatment was implemented by trained therapists; we then evaluated the same treatment when it was self-monitored by the client.

## METHOD

### *Participants and Setting*

Jack, a 19-year-old young man with Asperger syndrome, had been referred to a day-treatment program for the assessment and treatment of self-injury, including chronic skin picking that resulted in scarring and numerous open wounds to his forehead, mouth, nose, and hands (no formal measure of tissue damage was collected). Prior cognitive testing using the Stanford-Binet Intelligence Scale indicated that his cognitive skills were highly varied, with some exceptional skills (e.g., short-term memory = 147, 99.9th percentile) and some marked deficits (e.g., verbal relations = 73, 4th percentile). Treatment sessions were conducted in a small therapy room at the treatment center that contained a table, a chair, and a one-way observation mirror. Sessions were conducted during Jack's daily appointments (9:00 a.m. to 4:00 p.m.) during the first 2 weeks of his admission.

### *Measurement and Interobserver Agreement*

Skin picking was scored using a 10-s partial-interval recording system (Meany-Daboul, Roscoe, Bourret, & Ahearn, 2007) and was defined as Jack (a) closing his thumb and any finger around any portion of his body, (b) rubbing his hands or fingers against his skin, or (c) inserting his fingers into his nose. Skin picking was converted to a percentage by dividing the

number of intervals in which skin picking occurred by the total number of 10-s intervals in the session. Interobserver agreement was assessed by having a second observer simultaneously but independently score the occurrence of skin picking during 36% of sessions during the treatment evaluation. Observer's records were compared on an interval-by-interval basis, and mean agreement was 99% (range, 88% to 100%).

### *Procedure*

Results of a functional analysis (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994) indicated that Jack's skin picking was insensitive to tested social reinforcers, in that it occurred across all experimental conditions. Therefore, during the current evaluation, a therapist presented Jack with a passage from a programmed reading textbook, vocally prompted him to read aloud, praised him following completion of the passage, and then provided him with additional passages. This evaluation context was selected based on parental and self-report that he was most likely to engage in skin picking when asked to engage in this nonpreferred activity when at home or at school. He always complied with instructions to read during this evaluation. No consequences were provided for skin picking during baseline conditions.

Brief training was conducted prior to evaluating the treatment and consisted of awareness training, competing response training, and DRO exposure. Awareness training involved prompting Jack to watch himself engage in multiple instances of skin picking while positioned in front of a mirror. Competing response training involved prompting Jack to place his hands in his lap (if sitting) or in his pockets (if standing). During DRO exposure, we described a DRO 5-min schedule in which Jack could earn tickets, which were later exchangeable for \$0.10, after each 5-min period in which he did not engage in skin picking. This training and instruction required approximately 5 min to complete.

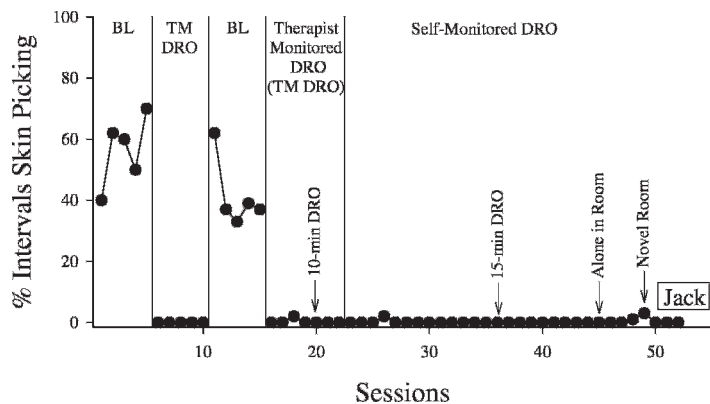


Figure 1. The percentage of intervals with skin picking during baseline, therapist-monitored DRO, and self-monitored DRO conditions.

Sessions during the therapist-monitored DRO phase were similar to those in baseline, except that the therapist timed 5-min intervals using a digital countdown timer and delivered praise and a ticket for successful completion of 5-min intervals without skin picking. Prior to each of these sessions, Jack was reminded that he had the opportunity to earn tickets by abstaining from skin picking. However, the therapist did not provide any prompting during sessions. Beginning with Session 20, we extended the DRO interval to 10 min.

Sessions were similar during the self-monitored DRO phase except that the therapist no longer mediated the use of the timer or the delivery of tickets. That is, the therapist taught Jack to set the timer to 10 min, to reset the timer following an instance of skin picking, and to place a ticket into an envelope (marked as Jack's tickets) when the timer sounded. Beginning with Session 36, we extended both the session time and the DRO interval to 15 min, and beginning with Session 45, we observed Jack implementing the procedure alone in the room while watching a preferred movie (an activity also reported to occasion high levels of skin picking; therapists observed from behind a one-way mirror). Beginning with Session 49, we observed Jack alone while watching a movie in a novel lounge at the day-treatment center. These latter two conditions were conducted (a) to

obtain a measure of the generality of the intervention across settings and (b) to ensure that the reductions in skin picking were not under stimulus control of the therapist's presence (i.e., the therapist was never present during these sessions).

#### *Treatment Integrity*

Data were collected on the accuracy of Jack's implementation of the self-monitoring program during the self-monitored DRO condition. Accurate implementation involved resetting the timer following an instance of skin picking, delivering a ticket when the timer expired (signaled by audible beeping), and resetting the timer after the timer expired. For each session the total number of correct implementations was divided by the number of opportunities to engage in those behaviors. Across the condition, Jack implemented the procedure with 91% accuracy.

## RESULTS AND DISCUSSION

Results of this evaluation are depicted in Figure 1. Jack engaged in skin picking during 56.3% of intervals during baseline sessions. However, immediately following the implementation of the therapist-monitored DRO 5-min schedule, skin picking was reduced to 0% of intervals. Withdrawal of this treatment

occasioned a return to near-baseline levels of skin picking ( $M = 39.7\%$ ), and reinstatement of the treatment condition again resulted in near-zero levels of skin picking ( $M = 0.2\%$ ), even when the DRO interval was extended to 10 min (beginning in Session 20). We then began the self-monitoring phase in which Jack timed his own reinforcement intervals and delivered his own token reinforcers. This change did not result in a disruption of treatment effects, even as the DRO interval was extended to 15 min, when in novel settings, or when the training therapists were removed from the environment ( $M = 0.2\%$ ).

The present study involved an effective application of therapist and self-monitored DRO as a treatment for the self-injurious skin picking of a young man with Asperger syndrome. This case was novel in that the reductions obtained from the initial DRO condition were maintained when the client independently managed the major aspects of his treatment (i.e., detecting instances of skin picking, timing interresponse intervals, and delivering token reinforcers).

A number of treatments have been developed to minimize the need for continuous observation during the treatment of problem behavior (e.g., noncontingent reinforcement schedules, Vollmer, Iwata, Zarcone, Smith, & Mazaleski, 1993; and enriched environment arrangements, Ringdahl, Vollmer, Marcus, & Roane, 1997; Vollmer *et al.*, 1994) and in the treatment of covert problem behavior (i.e., behavior that occurs only when individuals are not being observed; Grace, Thompson, & Fisher, 1996; Maglieri, DeLeon, Rodriguez-Catter, & Sevin, 2000; Piazza, Hanley, & Fisher, 1997). If effective, the addition of a self-monitoring component may greatly reduce the effort required by teachers and parents to implement DRO and may be relatively more likely to support maintenance of this treatment in natural environments (i.e., it requires little effort and training on the part of caregivers).

Self-monitoring and self-management procedures often require explicit contingencies to support accurate reporting (e.g., Ninness, Fuerst, Rutherford, & Glenn, 1991). That is, separate reinforcement contingencies may be arranged for the nonoccurrence of a problem behavior *and* for the accurate reporting of that behavior (e.g., if the target behavior occurred but the client reported it did not, no reinforcement would be delivered). In the current study, Jack accurately reported the occurrence or nonoccurrence of skin picking; thus, this additional contingency was not arranged. It is unclear to what extent individuals with developmental disabilities can and will accurately report their own behavior without explicit training and maintaining contingencies. Thus, future researchers are encouraged to evaluate the necessity of this additional contingency.

There are a few limitations that should be considered when evaluating the results of the current study. First, we did not take any formal measures of improvements in tissue damage as a result of this intervention (e.g., Iwata, Pace, Kissel, Nau, & Farber, 1990). Second, we did not collect formal generalization data pertaining to the use of this intervention outside the clinic. Anecdotally, we can report that on follow-up visits to the clinic, informal inspection of Jack's skin indicated it had healed considerably, suggesting that he had implemented the procedure with sufficient frequency and integrity. Further, his parents reported that they were no longer concerned with his skin picking. Despite these positive reports, more formal measures of generality and maintenance would be preferable in future investigations.

Although the results of the current investigation are promising, they should be considered as preliminary. It is unclear how effective self-monitored DRO will be across a larger group of individuals with developmental disabilities, how effective this treatment will be compared to other interventions, and to what extent these interventions will be implemented in natural

environments. With accumulated data, it may be possible to identify individuals for whom self-monitoring is and is not indicated (e.g., based on diagnosis, IQ, verbal abilities, and prerequisite skills).

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