

*TREATMENT OF SLEEP PROBLEMS IN  
A TODDLER: A REPLICATION OF THE  
FADED BEDTIME WITH RESPONSE COST PROTOCOL*

ROSEMARY ASHBAUGH AND STEPHANIE M. PECK

GONZAGA UNIVERSITY

Multiple sleep problems of a 2-year-old girl improved following treatment with a faded bedtime with response cost procedure (Piazza & Fisher, 1991). These results extend the literature by implementing treatment in a home setting with a nondisabled child using the parents as therapists.

DESCRIPTORS: pediatric sleep problems, fading, response cost

Sleep disturbances are among the most common behavior problems encountered in young children (Kataria, Swanson, & Trevathan, 1987). Therefore, it is important to identify a procedure that is effective, is easy to implement, has minimal side effects, treats multiple sleep problems, and can be implemented by parents. Piazza and Fisher (1991) effectively used faded bedtime and response cost procedures for 4 nonverbal children who had mental disabilities, self-injurious behavior, and multiple sleep problems. In all cases, the intervention resulted in increased sleep during appropriate times, decreased sleep during inappropriate times, and decreased night wakings.

The present study was conducted to replicate and further test the efficacy of the faded bedtime with response cost procedure (Piazza & Fisher, 1991). To extend the literature, this study was conducted with a nondisabled toddler and her parents in a home setting using an ABAB design.

#### METHOD

Alicia was 2 years old and had no developmental, behavioral, or health impair-

---

This study was conducted in partial fulfillment of requirements of the Bachelor of Education degree in Special Education at Gonzaga University by the first author.

Address correspondence to Stephanie M. Peck, Department of Special Education, AD Box 25, Gonzaga University, Spokane, Washington 99258-0001 (E-mail: speck@soe.gonzaga.edu).

ments. She lived at home with both parents, was the only child, and attended preschool during the day, where a daily 1-hr nap was scheduled. Treatment was conducted at home by her parents. (Alicia's mother is the first author.)

Data were collected over 24-hr periods using a scatter plot and 15-min partial-interval recording system. A 24-hr period began at 6:00 a.m. on one day and ended at 5:59 a.m. on the next day. Each 24-hr period was divided into 15-min intervals (96 total intervals); every 15 min, one of Alicia's parents or preschool staff marked whether she was asleep or awake. Alicia was considered to be asleep if her eyes were closed, she displayed no bodily movements, and her breathing was slow and regular. Alicia's parents determined her ideal sleep times to be 9:00 p.m. to 7:00 a.m. and 12:00 p.m. to 1:00 p.m.; all other times were ideal wake times. The dependent variable was the number of 15-min intervals with disturbed sleep, which was calculated by adding the number of intervals in which Alicia was sleeping during ideal wake times and the number of intervals in which Alicia was awake during ideal sleep times. Interobserver agreement data were collected by Alicia's father and mother, who independently recorded whether Alicia was asleep or awake on 23% of 24-hr periods. Agreement was 100% and was calculated using a point-by-point agreement ratio.

*Design and Procedure*

An ABAB design was used to evaluate the effectiveness of the faded bedtime with response cost intervention. During baseline, no scheduled bed, nap, or wake-up times were implemented, as was consistent with the parents' typical routine. No attempts to awaken Alicia were made if she slept during ideal wake times. If Alicia awoke during the night and came to her parents' bed, she was allowed to stay in their bed for the rest of the night, as was typical for the family's routine.

The treatment procedure was similar to that described by Piazza and Fisher (1991). Prior to intervention, an initial bedtime was established by computing the average time Alicia fell asleep during baseline (10:30 p.m.) and adding 30 min (11:00 p.m.). The fading procedure consisted of adjusting Alicia's bedtime according to the actual onset of sleep for the previous night. If Alicia fell asleep within 15 min of the scheduled bedtime, her bedtime the following night was 30 min earlier. However, if she did not fall asleep within 15 min of the scheduled bedtime, then her bedtime the next night was 30 min later. The parents kept Alicia from falling asleep prior to the scheduled bedtimes by playing with her, and they awakened her at the scheduled wake times. This was implemented until the goal of 9:00 p.m. was reached. (Following the return to baseline, the 9:00 p.m. bedtime was immediately reinstated.)

If Alicia was not asleep within 15 min of being put to bed, she was removed from bed and kept awake by her parents playing with her for 30 min (response cost). This procedure was repeated until Alicia fell asleep within 15 min of being put to bed. If Alicia woke up at night and came to her parents' bed, the parents put Alicia back in her own bed and told her to go back to sleep. This procedure was different from that of Piazza and Fisher (1991) and was implemented upon parental request.

RESULTS AND  
DISCUSSION

Results are shown in Figure 1. During baseline, the number of intervals with disturbed sleep ranged from 8 to 31 ( $M = 18$ ). When treatment was implemented, the number of intervals with disturbed sleep gradually decreased to a mean of 6 intervals (range, 1 to 14). When baseline procedures were reinstated, disturbed sleep immediately increased to a mean of 24 intervals (range, 20 to 29). When treatment was reinstated, disturbed sleep again gradually decreased to a mean of 3 intervals (range, 0 to 13).

The results of this study replicated those of Piazza and Fisher (1991), and they support the effectiveness of the faded bedtime and response cost treatment package in improving the sleep-wake cycles of children. The intervention package allowed Alicia to rapidly establish a more regular sleep pattern. Alicia's parents reported that positive side effects of the intervention included no longer having Alicia in their bed at night and that they were less sleep deprived. In addition, they reported that Alicia's consistent sleep schedule was maintained for nearly 1 year following the study.

One limitation of the current investigation is that faded bedtime with response cost is a multicomponent treatment, and it is unknown whether both components of the package are necessary to achieve these results. Further research on the independent effects of the response cost and fading components of the procedure should be conducted via a component analysis.

A second limitation may be the dual roles (i.e., parent and researcher) of the participant's mother, who was an undergraduate student majoring in special education and who was enrolled in a course in behavioral principles and interventions. Although she obtained approval from the university's com-

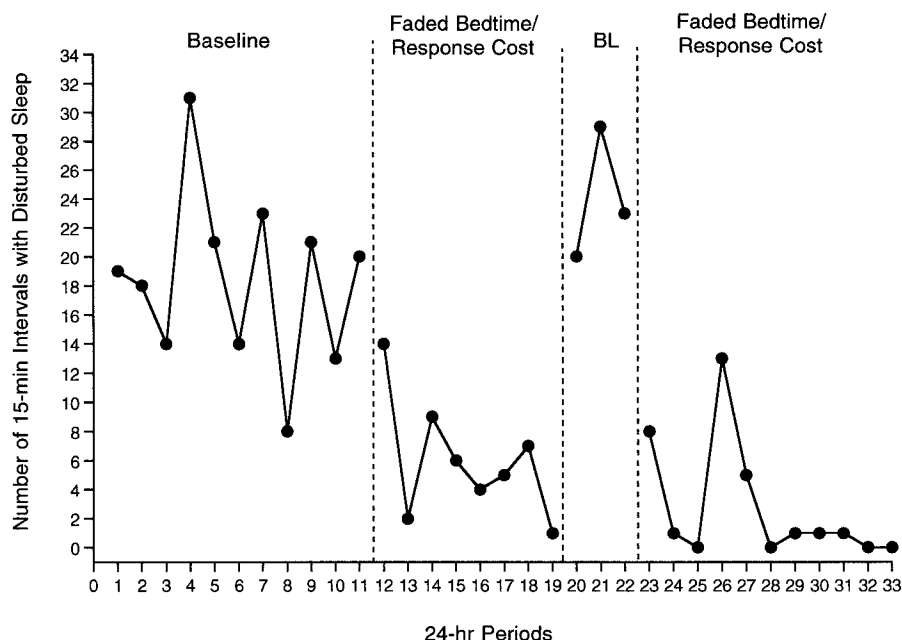


Figure 1. Number of 15-min intervals of disturbed sleep per 24-hr period during baseline (BL) and faded bedtime with response cost conditions.

mittee for research with human subjects prior to the study, it should be noted that her dual role as researcher and mother may have affected the validity of the data. Although independent reports of sleeping were obtained from day-care providers, most of the data were recorded while the child was at home, where limited independent reports (other than from the child's father) were available. A related limitation is that the amount of sleep that occurred between 11:00 p.m. and 6:00 a.m. may have been overestimated because the parents were sleeping at this time. Both parents reported that they believed the data were representative of Alicia's true sleep behavior because she always awakened them when she woke up in the night. If overestimates did occur, they did so consistently throughout all conditions of the study.

The results of the present investigation extend those of Piazza and Fisher (1991) by demonstrating that modifications can be made to the procedure without decreasing its

effectiveness. The response cost procedure in this investigation lasted for 30 min rather than for 60 min because of the young age of the participant and parental preference. Also, in this investigation, the participant was returned to bed when she woke up during the night and came to her parents' bed, whereas Piazza and Fisher allowed the child to remain in the parents' bed. In the current investigation, neither of these changes appeared to decrease the effectiveness of the intervention.

## REFERENCES

- Kataria, S., Swanson, M. S., & Trevathan, G. E. (1987). Persistence of sleep disturbances in pre-school children. *Journal of Pediatrics*, *110*, 642-646.
- Piazza, C. C., & Fisher, W. (1991). A faded bedtime with response cost protocol for treatment of multiple sleep problems in children. *Journal of Applied Behavior Analysis*, *24*, 129-140.

Received March 17, 1997

Initial editorial decision May 1, 1997

Final acceptance September 24, 1997

Action Editor, Cathleen C. Piazza