SUPPLEMENT MATERIALS

PBS

A premise for PBS is that children's behaviors are functionally related to their environment. In other words, students' problematic behaviors are seen as the result of inappropriate learning in interaction with other people. PBS divides the environment surrounding problematic behaviors into A, B, and C: 1) problematic behaviors are classified as B, 2) antecedent, which comprises incidents and environments that caused the problematic behaviors, are classified as A, and 3) consequences that reinforce or extinct B are classified as C. Based on theories of behaviorism, PBS decreases children's problematic behaviors and promotes positive behaviors by changing A & C, which are environmental factors that maintain their problematic behaviors.[1] In SWPBS, PBS is applied to the entire system.

SWPBS involves 1) defining and teaching positive social expectations, 2) acknowledging appropriate behaviors, and 3) establishing consistent consequences for problem behaviors. The focus of SWPBS is on establishing a positive social climate in which behavioral expectations for students are highly predictable, directly taught, and consistently rewarded.[2]

In this study, the SWPBS intervention consisted of two phases: rule training and contingency management. Rule training corresponded to changing the antecedents of problem behaviors by defining and teaching expected/desirable behaviors incompatible with problem behaviors, while contingency management was equivalent to changing the consequences of behaviors by acknowledging and providing rewards for rule compliance. It was hypothesized that the intervention would first improve caregivers' positive interactions with children (in the form of attention, praise, and encouragement) and then decrease problem behaviors and increase desirable behaviors in children.

Procedure

SWPBS team meeting

PBS team meetings were held every week with caregivers, staff members, and researchers. Information covered in this meeting included 1) introduction of general PBS procedures, 2) discussion and determination of target behaviors, 3) introduction of and training for pre- and post-measurement methods, 4) rule education, 5) intervention training, and 6) problem solving. Since problems occurred frequently in the beginning while implementing intervention, researchers frequently provided consultation and support by phone or through SNS.

Developing rule

The team discussed and eventually adopted three core values (i.e., security, respect, and kindness) expected in the orphanage. From these values, the caregivers and researchers developed five rules: 1) keep one's hands and feet to oneself, 2) do not respond to bad behavior/comments, 3) ask for others' permission, 4) speak to each other kindly, and 5) follow directions and say "yes" within 5 seconds when ordered or asked by the caregiver to do something.

Rule training

We created video clips to demonstrate the expected behaviors for each rule and what behaviors constituted violations of the rules. Rule training consisted of the following steps: 1) teaching the rule; 2) providing specific examples of good and bad behaviors; 3) modeling the expected behaviors; and 4) having children practice the behaviors and then review their performance.

We also demonstrated the process of giving a token (i.e., a stick) for rule-compliant behaviors and a verbal correction for rule-violating behaviors, and encouraged caregivers to follow this process. Finally, a bulletin board with the rules listed as well as two counting boards were displayed in each room, allowing anyone to easily review the rules.

Contingency management

After completing the rule training, the caregivers monitored the children's behavior and gave tokens (in the form of sticks) to those who complied with the rules during two predetermined 30-minute intervention sessions each day. The caregivers were given 28 wooden sticks as a bundle and were instructed to use all 28 within the 30-minute period. This intervention was designed to encourage the caregivers to praise and reinforce children in high rates. At the beginning of the 30-minute session, the caregivers first asked children to read the rules together. While the children had free time, the caregivers observed their behaviors and distributed sticks with verbal praise when children displayed rule-compliant behavior. For any rule-violating behavior, the caregivers remind-

ed the child of the rules again and corrected his behavior verbally. At the end of each 30-minute intervention, the caregivers recorded the number of sticks earned by each child on the counting board.

Two kinds of rewards were provided—personal and group rewards. For personal rewards, the number of sticks earned by each child was counted twice a day. The child with the highest cumulative number of sticks from the first count to the second count was selected as the day's MVP (Most Valuable Player), and his name was recorded on the MVP bulletin board. The MVP could then choose a reward from the "reward menu," which contained items not exceeding $1 (e.g., snacks, beverages, cup noodles, stationery, allowance, and small toys). The cumulative number of sticks earned by all the children in each room was marked on the group counting board that was in the shape of a thermometer. When the scale of the thermometer reached the target value (i.e., 700 degrees), the children were given a group reward—a party in which they ate ramen or fried chicken together.

After two weeks, the intervention was generalized across time and setting, and was implemented at all times and in all places throughout the institution. In other words, the children received the tokens at anytime and anywhere in the orphanage whenever they complied with the expected behaviors. Each stick in the bundle provided to each caregiver had her name on it, which enabled us to count the number of tokens distributed by each caregiver. Based on this, the caregiver who distributed the most tokens received a reward. Thus, the caregivers' positive interactions (i.e., paying positive attention to children and rewarding their desirable behaviors) were reinforced.

Data collection

Data collection was done by direct behavioral observation and caregiver report. Children were reluctant about being videotaped or observed by outside observers. When outside observers tried to videotape or observe the children, they tended to actually leave the room to avoid being observed (i.e., the Hawthorne effect). Some children showed indiscriminate friendliness to strangers and refused to leave them. Thus, the decision was made that the caregivers count the target behaviors with a small manual counter in their pocket that is invisible from the outside.

Caregivers tallied the frequency of each behavior among the children using a counter during the pre- and post-intervention measurement phases. Specifically, the frequencies were counted during a period lasting 30 minutes at six random times over a week for each room during each measurement phase. The 30-minute observation time was chosen based on the time when the caregivers reported high frequencies of problematic behaviors, specifically during the 30 minutes before going to school starting after breakfast (7:00 am) and the 30 minutes after dinner (5:30 pm) when children were in their respective rooms and were playing freely.

Data analysis

The mean of direct observation data was calculated by dividing the number of target behavior occurrences across 30 minutes by the total number of observations. Subsequently, the pre-post intervention difference in the mean frequency of observed target behaviors was obtained as a percentage.

Next, differences in pre- and post-scores for the level of problem behaviors perceived by caregivers were analyzed. First, the mean and standard deviation were calculated using SPSS v.22, and then, a corresponding sample t-test was performed to determine if there were significant differences between the pre- and post-scores.

REFERENCES

1. Horner RH, Carr EG, Strain PS, Todd AW, Reed HK. Problem behavior interventions for young children with autism: a research synthesis. J Autism Dev Disord 2002:32:423-446.
2. Sprague J, Horner R. School Wide Positive Behavioral Support. In: Jimerson SR, Furlong MJ, Editors. Handbook of School Violence and School Safety: From Research to Practice. Mahwah, NJ: Erlbaum Association Inc, 2007, p.447-462.