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The Effect of Behavioral Skills Training on Special Education Teachers Accurate Delivery of the Picture Exchange Communication System

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Purpose: This study delves into the practical implications of behavioral skills training, which includes written instruction, modeling, role play, and feedback, on special education teachers' accurate delivery and maintenance of the picture exchange communication system (PECS) procedures.

Methods: The research involved training two elementary special education teachers and one secondary special education teacher, who had no prior experience or training in PECS, to implement PECS in the first stage following the behavioral skills training. The study employed multiple baselines across participant designs, including baseline, written instruction, modeling, role play, feedback, and maintenance phases.

Results: The findings underscore the practical benefits of this training, as it significantly improved the teachers' performance accuracy in the first stage of PECS and maintained their performance accuracy over time, thereby enhancing their effectiveness in the classroom.

Conclusions: The behavioral skills training indicated that could be training strategy that focuses on the feasibility of special teachers.

Keywords: Picture exchange communication system, Behavioral skills training, Special educational teacher

INTRODUCTION

Using the same means of communication with the other person helps express one's desires or intentions. Understanding the desires or intentions of disabled persons who show problematic behaviors, such as crying, irritation, pestering, and offensive action, is not easy. Such problematic behaviors cause trouble for oneself and one's peer or teacher relationships. Furthermore, such behaviors result in one of the most significant adverse effects on social integration [1]. Problematic behaviors of disabled students significantly affect the psychological exhaustion of special education teachers, lowering their efficacy among them [2]. Against this background, the necessity of an appropriate response to such problematic behaviors is emphasized in special education, and in this context, behavioral intervention has continued to be highlighted. The Ministry of Education has expanded its political and financial support for interventions for problematic behaviors in school settings [3].

Students with a moderate level of intellectual disability or autism are often observed

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to attempt nonverbal communication rather than verbal communication in their daily lives. To help students with disability acquire communication skills and practice proper communication, Augmentative and Alternative Communication (AAC) methods are adopted. One such AAC method is the Picture Exchange Communication System (PECS), a supplementary communication tool based on pictures or symbols. This method is recognized as an evidence-based practice since its positive effects are frequently reported regarding communication ability, social interaction ability, increase of common interests, and reduction of inappropriate problematic behaviors (NCAEP, 2020). In domestic studies, the PECS is reported to improve communication skills, facilitate class participation, and reduce problematic behaviors [4-7]. As such, helping disabled students with difficulties in verbal communication utilizes the PECS as a strategy to improve their communication skills and prevent problematic behaviors. Thus, special education teachers must use the PECS in education settings.

There have been various attempts among special education teachers, therapists, and parents with a disabled child to improve this strategic ability, and many different training procedures have been developed accordingly [8,9]. Among these, Behavior Skills Training (BST) is a training process focusing on the practicality of each high-performance accuracy within a short time through written instruction, modeling, rehearsal, and feedback. BST has been used in training with various intervention strategies, such as Functional Analysis, Discrete Trial Teaching (DTT), Incidental Teaching, and Behavior Intervention Plans [10-12]. This study aims to teach the PECS to special education teachers in the application of BST and to examine its effects on the PECS performance accuracy among special education teachers.

First, this study presents the effects of BST on PECS performance accuracy among special education teachers. They were followed by the effects of BST on the PECS performance accuracy maintenance of special education teachers.

METHODS

Research participants

Two elementary school special education teachers and one middle school special education teacher participated in this study. These three were selected among those with no experience in PECS classes and no experience training in this area. Table 1 shows specific characteristics of special education teachers participating in this study.

Training place

The training employed in this study was conducted at the affiliated development center behavioral analysis room of J Pediatrics Clinic, D Metropolitan City. The behavioral analysis room was divided into two sub-rooms as large as 10 m^2 and 7.5 m^2, respectively. Observing the inside of the 10 m^2 large room was possible through a one-way mirror. The behavioral analysis room included training instruments in a basket, such as a communication board, photos, preferred stimulus, etc. The room was also equipped with the Cannon VIXIA mini X video camera.

Research tools

PECS

This study was intended to test the first step among 6 steps of the PECS. Step 1 of the PECS was designed to study Rosales et al. [13]. For the first step of the PECS, assignment analysis was performed in this study on 14 procedures from configuration to response recording. An operational definition is specified for behaviors a communication party should practice as in Table 2.

Behavioral skills training

Behavioral skills training was designed based on the previous study of Shin et al. [14]. In this study, behavioral skills training consisted of the following sections: written instructions through a 3-page printout with descriptions and pictures of the first step of the PECS; modeling where the researcher and collaborator played the roles of the communication partner and a child, respectively; role play of the researcher, collaborator, and participants; and participants' feedback to the PECS.

PECS performance accuracy checklist

Table 1. Research participant characteristics

Division	Major	Gender	Educational experience	Highest level of education	Workplace
Teacher A	Elementary special education	F	13 years	Graduate school graduate	Special class
Teacher B	Elementary special education	F	3 years	College graduate	Special class
Teacher C	Secondary special education	F	8 years	College graduate	Special school

Table 2. Definition of each procedure in Step 1 of the PECS

		Definition of each procedure
Preparation	1	Instruments necessary for the PECS (communication board, photos of preferred stimulus, and preferred stimulus) are prepared.
	2	Recording sheets and writing tools to record each child's responses are prepared.
	3	Stimulus elements that children prefer are put in areas out of children's reach.
	4	Before the first attempt, opportunities were given to approach the preferred stimulus, and it was checked if that stimulus was preferred.
Performance	5	One preferred stimulus was placed on the desk, and the photo of the preferred stimulus sticking on the communication board was put on the desk.
	6	The communication board with a photo of the stimulus preferred by children was placed within a child's reach (within 30 cm), and then the preferred stimulus was presented.
	7	A period of 1 or 2 seconds was given for the child to respond.
	8	Point prompting was employed for 1 or 2 seconds when the child did not find the photo.
	9	Physical prompting was done when the child did not reach a hand toward the photo after being given prompting.
	10	When the child picked up the photo and reached a hand, the researcher reached out his palm and received the picture immediately.
	11	When the child passed the photo, the corresponding stimulus was presented promptly, along with social reinforcement regardless of prompting (with no verbal prompting).
	12	The child was given a specific time (20 seconds or less) to approach the stimulus, and then the stimulus was taken back.
	13	After each attempt, the child's response was recorded in the response record sheet.
	14	The photo is returned to the communication board while the child is playing with or consuming the stimulus.

The PECS performance accuracy checklist consisted of the preparation and performance sections based on the procedures of step 1 of the PECS. The preparation section evaluates 4 items regarding preparation for materials, recording sheets, and writing tools for PECS education, location of preferred stimuli, and opportunities to approach the preferred stimulus before the first attempt. The performance section evaluates 10 items regarding a series of procedures for the first step of the PECS. The PECS performance accuracy checklist checks one of two items: When the performance is appropriately aligned with the operational definition (+) and when an error is involved in the performance (-)—results of a maximum of 10 attempts may be recorded in the recording sheet. As to the preparation step, only the first attempt is evaluated.

Study design

The process consisted of the baseline, behavioral skills training, and maintenance step. Behavioral skills training consisted of written instructions, modeling, role play, and feedback.

Procedure

In this study, virtual preferred stimuli selected for PECS training included a toy airplane, automobile, and lion figure. Photos of the actual toys and figures were taken in 5×5 cm photo cards. After each training step, participants were given a resting time of 5 minutes. Step 1 of the PECS was performed 10 times on the collaborator who played the role of a child, and then the performance accuracy was measured after each step of training ended. The achievement standard for PECS performance was set to an accuracy of 90% for 3 consecutive times.

Baseline

In the baseline step, no materials regarding PECS performance were presented, and no feedback on a special education teacher's performance was given either. Behavioral skills training began when the PECS performance accuracy was stable at least thrice.

Behavioral skills training

Written instructions

In the step of written instructions, participants were given a 3-page printout and 20 minutes to read about the PECS Training Manual [15]. The printout includes descriptions of the configuration for the performance of the first step of the PECS, preference evaluation, and performance procedures, as well as instructions on the communication board, photographing, etc. It likewise includes instructions on parts likely to involve mistakes in the first step of PECS performance. After 20 minutes, printouts were collected. Participants were not allowed to ask questions about the first step of the PECS in the step of written instructions.

Modeling

The researcher provided the collaborator with the role of a child, modeling the first step of PECS performance. The researcher performed the first step of the PECS 10 times and let participants see it. During the modeling step, participants were allowed to read the printout used for written instructions. In the modeling step, the researcher provided participants with recording sheets regarding children's responses, and no separate time for Q&As or feedback was provided.

Role play

The researcher and collaborator played the role of a child alternately. The first step of the PECS was repeated 10 times for 15 minutes among participants. The researcher and collaborator directed random situations at least twice during the step of role play, including the case where no stimulus photo was given to participants or no preferred stimulus was selected. Before the role play, the printouts about written instructions were distributed for 5 minutes and then collected before the role play and performance evaluation began.

Feedback

Participants were asked to perform the first step of the PECS with the collaborator who played the role of a child. The researcher provided verbal feedback regarding mistakes and aspects to be corrected according to the performance process of the first step of the PECS. In addition, the researcher shared positive opinions on the fact that participants accurately performed the procedures. During the 10 attempts, feedback continued to be given within 15 minutes.

Maintenance

After participants met the achievement criteria in the first step of the PECS, the maintenance evaluation was conducted two weeks after all training was completed to check whether the accuracy of PECS performance was correctly maintained. Under the same conditions as the baseline regarding the accuracy maintenance of the first step of the PECS, observation and evaluation were performed 10 times for 3 days.

Data measurement

The accuracy of participants' PECS performance was measured in each step of behavioral skills training and then visualized for comparison. To calculate the participants' performance accuracy, the number of steps performed was divided by the total number of steps and multiplied by 100.

Confidence level comparison between observers

To verify the confidence level of measurement data, an assistant observer was selected in addition to the researcher. The assistant observer was a Class-1 language rehabilitation therapist with 7 years of experience attending the master course at the Department of Special Education at the time. Confidence level was measured comparatively between observers. To determine the confidence level between observers, one session in the baseline step, 1 session in the written instruction step, 1 session in the modeling step, 1 session in the role play level, 2 sessions in the feedback step, and 1 session in the maintenance step were randomly selected and measured. The confidence level between observers was 90.5%.

Intervention fidelity

Of videos of the entire training course, 30% were randomly selected and observed by two doctors of special education. The checklist of intervention fidelity evaluation was prepared in reference to questions used in the study of Cardon [16], and it consisted of the following sections: preparation before PECS training, training course, and appropriateness of the performance accuracy evaluation process. Nine questions were evaluated on the Likert 5-point scale, then the intervention fidelity was determined. As a result, the intervention fidelity of this study was 4.79 points on average.

Social validity

The social validity evaluation was conducted among special education teachers who participated in this study after its completion to measure social validity. The social validity evaluation method was prepared with reference to the study of Shin et al. [9]. The following aspects were evaluated in the 5-point scale: general aspects of behavioral skills training for the first step of the PECS, satisfaction with training contents and methods, and social importance of PECS training. The questionnaire on social validity measurement included 6 questions, with the social validity of this study being 4.90 points on average.

RESULTS

Effects of behavioral skills training on the PECS performance accuracy of special education teachers

Table 3 shows changes in the PECS performance accuracy of special education teachers in each step of behavioral skills training.

Table 3. Changes in the PECS performance accuracy of special education teachers

Division	Baseline	Behavioral skills training				Maintenance
		Written instructions	Modeling	Role play	Feedback	
Teacher A	0	11.0	39.5	48.8	74.2	97.6
Teacher B	5.4	29.5	62.4	73.8	91.6	92.9
Teacher C	2.9	20.2	65.2	83.4	93.1	99.3

Figure 1 shows changes in the performance accuracy of participants. In the baseline step before the beginning of behavioral skills training, participants' accuracy was 2.76% (0-5.4) on average. After completing the training course, the average accuracy increased drastically to 86.3% (74.2-93.1).

After the written instruction, the performance accuracy of participants was improved to 17.5% (11.0-24.1) on average. After the modeling step, it improved to an average of 35.5% (28.5-45.0). After the role play step, it was improved to 13.0% (9.3-18.2). After the feedback step, it was improved to 17.5% (9.4-25.4). To meet the standard of achievement in the first step of the PECS, participants needed 14.3 times of training (12-17) on average.

Effects of behavioral skills training on the maintenance of the PECS performance accuracy of special education teachers

The effects of behavioral skills training on maintaining the PECS performance accuracy of special education teachers who participated in the study were examined among participants.

Teacher A showed an accuracy level of 92.9%, 100%, and 100% (97.6% on average) during the maintenance evaluation period, indicating that the effects of this training were maintained. To meet the standard of achievement in the first step of the PECS, Teacher A needed 17 times of training. The accuracy level of Teacher B was 92.9% on average, which indicates that the performance on the first step of the PECS was maintained. To meet the standard of achievement, Teacher B needed 12 times of training. Teacher C's training ended in the 14th session. The accuracy level was 99.3% on average, and the performance in the first step of the PECS was maintained.

DISCUSSION

First, the behavioral skills training program consisted of written instruction, modeling, role play, and feedback sessions, and its positive effects on the performance accuracy of the first step of the PECS were verified among participants. This finding supports the study of Rosales et al. Which reported that behavioral skills training was applied to undergraduate and graduate students in rehabilitation departments with no experience with the PECS. As a result, they learned how to use the PECS. Therefore, this can be an effective strategy for training individuals on using PECS. In this study, it took 230 minutes on average to meet the standard of achievement in the first step of the PECS, which is about 50 minutes more than 179 minutes, the average time that the previous study by Rosales et al. suggested for training. It seems that this difference from the prior research is because the steps of written instruction were fixed to 20 minutes, whereas the steps of modeling/role play/feedback were fixed to 15 minutes in this study. In addition, the standard of achievement for accurate performance in the first step of the PECS was set to at least 90% for 3 consecutive times in this study, while in the previous study, it was set to 80%, which is thought to be the cause of such difference. Second, in the evaluation of maintenance performed after the completion of training, the performance accuracy among participants in the first step of the PECS was verified to have been maintained, which indicates that behavioral skills training is effective in maintaining the PECS performance accuracy of special education teachers. The performance accuracy of special education teachers who participated in this study was verified to be similar to or higher than that in the feedback step, the final step of behavioral skills training.

This study confirms that behavioral skills training was effec-

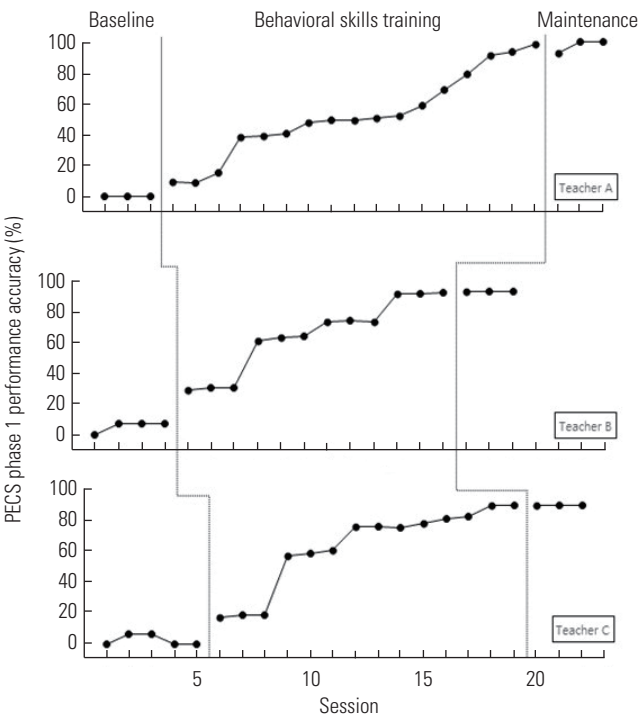

Figure 1. PECS performance accuracy.

tive in helping individuals with no theoretical knowledge or experience acquire specific strategies for disabled students. Behavioral skills training is reported to be effective in helping therapists, special education teachers, and parents with a disabled child to acquire specific strategies within a short period [17]. One significant difference between behavioral skills training and existing training programs is the focus on the accurate delivery of training strategies to enhance strategic feasibility [18]. For behavioral skills training to be applied to various special education teachers, it is necessary to continue attempts to ensure the efficient provision of objective feedback with expert participation minimized.

The following are the limitations of this study and suggestions for future research: First, the PECS consists of 6 steps from step 1: How to communicate to step 6, but in this study, the primary goal is to improve the performance accuracy in the first step of the PECS. For individual special education trainees with various communication needs to be able to use the PECS, special education teachers need to understand and make skillful use of each step. Therefore, future studies need to train special education teachers with all of these PECS steps, and based on the results, this program needs to be applied to diverse individuals in the field of special education. Second, this study presents different scenarios in which the collaborator plays the role of a child. The performance accuracy in the first step of the PECS among special education teachers was also measured while the collaborator played the role of a child. Special education teachers who participated in this study could perform the first step of the PECS skillfully. Still, this method was not applied to actual targets of special education who would use the PECS in the field. A future study needs to examine whether the performance accuracy of special education teachers in this study could be generalized to actual special education targets.

REFERENCES

1. Park JK, Kim ER, Kwon SH. Current status and perception on parents' intervention toward problem behaviors of children with disabilities. KCPMHD. 2014;57(3):23-48.
2. Kim JK, Kang HJ. Relationship between perception of students' behavior problems and burnout of special education teachers. JSE. 2020;36(3):1-20.
3. Ministry of Education. Special education operation plan; 2023.
4. Choi SM, Kwak SC. A study on the effects of intervention using a study on the effects of intervention using picture exchange communication system (PECS) on the class participation behavior for the students with developmental disabilities. JSCE. 2014;16(2):195-215.
5. Han ES, Kim EK. Effects of positive behavior support using picture exchange communication system on problem behaviors of the elementary school student with autism spectrum disorder. JBAS. 2016;3(2):17-41.
6. Kim IW. Effects of PECS program on decreasing problem behaviors of children with autism. Master's thesis. Kongju University; 2008.
7. Park HH. The effects of using PECS on communication expression behavior and problem behaviors of students with autism. Master's thesis. Daegu University; 2009.
8. Graff RB, Karsten AM. Assessing preferences of individuals with developmental disabilities: a survey of current practices. BAP. 2012;5:37-48.
9. Hansard C, Kazemi E. Evaluation of video self-instruction for implementing paired-stimulus preference assessments. JABA. 2018;51(3):675-680.
10. Fetherston AM, Sturmey P. The effects of behavioral skills training on instructor and learner behavior across responses and skill sets. RDD. 2014;35(2):541-562.
11. Hogan A, Knez N, Kahng S. Evaluating the use of behavioral skills training to improve school staffs' implementation of behavior intervention plans. JBE. 2015;24:242-254.
12. Sarokoff RA, Sturmey P. The effects of behavioral skills training on staff implementation of discrete-trial teaching. JABA. 2004;37(4):535-538.
13. Rosales R, Stone K, Rehfeldt RA. The effects of behavioral skills training on implementation of the picture exchange communication system. JABA. 2009;42(3):541-549.
14. Shin JW, Park CW, Lee HS. The effect of behavioral skills training on the accuracy of discrete-trial teaching implementation for parents of children with developmental disabilities. Journal of Behavior Analysis and Support. 2021;8(1):23-42.
15. Frost L, Bondy A. The picture exchange communication system training manual. Newark, DE: Pyramid Educational Products. 2002
16. Cardon TA. Teaching caregivers to implement video modeling imitation training via iPad for their children with autism. RASD. 2012;6(4):1389-1400.
17. Kang YM, Kang YM, Son SH. The effects of individualized positive behavior interventions and supports (PBIS) on class engagement of a student with intellectual disabilities. JBAS. 2021;8(3):75-100.
18. Parsons MB, Rollyson JH, Reid DH. Teaching practitioners to conduct behavioral skills training: a pyramidal approach for training multiple human service staff. BAP. 2013;6:4-16.