Efficacy of Choice of Preferred Engagement Stimuli on Escape-Maintained Disruptive Behavior

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Abstract

This study compared the efficacy of no choice and choice of preferred engagement stimuli to reduce escape-maintained disruptive behavior of pupils in kindergarten with developmental disabilities in inclusive classes. This study demonstrated how functional behavior assessment can be conducted in a school setting to determine the functional relationship between escape-maintained disruptive behavior and preferred engagement stimuli. The treatments were alternated. While both treatments were effective at reducing escape-maintained disruptive behavior, the results demonstrated a greater reduction with a choice of preferred engagement stimuli. The study extended the use of the choice of preferred engagement stimuli to young children and included an evaluation of the treatments via a social validity measure completed by the teachers.

Introduction

Disruptive behavior in young children with developmental disabilities is likely to interfere with the learning process and leads to acts of physical aggression (Kaiser & Rasminsky, 2012). These children are also likely to experience peer rejection and negative interaction with teachers (Dunlap et al., 2006). As a result, teachers frequently used consequence-focused procedures in their classrooms. These procedures could involve

reinforcement (e.g., the mystery motivator program and token system) or punishment (e.g., over-correction, extinction, and time- out (Alstot & Alstot, 2015).

Such procedures are often ineffective, as they are implemented subsequent to the occurrence of disruptive behavior. The effects of such procedures are limited, in that once the teacher stops using them, the disruptive behavior often returns (Shores, Gunter, & Jack, 1993). This is because they were not designed to target the function of disruptive behavior (Ingram, Lewis-Palmer, & Sugai, 2005).

Teachers began to employ function-based treatments, which identify the function that the disruptive behavior serves (Schlenker-Korb, 2014). These treatments have demonstrated considerable improvements in children's behavior (Nahgahgwon, 2008; Reeves, Umbreit, Ferro, & Liaupsin, 2013; Wood, Ferro, Umbreit, & Liaupsin, 2011). The treatments are based on the findings of a functional behavior assessment (FBA; Dunlap et al., 2006); this is a problem-solving process used to identify antecedent variables, which immediately precede disruptive behavior, and consequence variables, which immediately succeed such behavior (Sugai, Sprague, Horner, & Walker, 2000).

The FBA sequence for assessing these variables consists of indirect (e.g., record reviews and interviews) and direct descriptive assessments (e.g., scatter plots and direct observations) and experimental functional analysis, which systematically manipulates antecedent and consequent events to identify the hypothesis regarding the function of the disruptive behavior (Schlenker-Korb, 2014). Once FBA is conducted, a function-based treatment can be implemented to teach behaviors that replace or counteract this function, modify antecedent variables that reduce the likelihood of disruptive behavior, and provide consequence variables that increase the likelihood of replacement behaviors (Sugai et al., 2000).

Numerous reviewers of these treatments (Burton, 2012; Jolivette, Wehby, Canale, & Massey, 2001; Schlenker-Korb, 2014; Watanabe & Sturmey, 2003) have demonstrated the effectiveness of choice-making techniques. Offering a choice of preferred stimuli or activities to positively influence the behavior of children with disabilities has become a highly salient technique in behavioral function-based treatments (Burton, 2012; Schlenker-Korb, 2014).

Children choose from multiple activities or stimuli prior to completing a task (Burton, 2012; Schlenker-Korb, 2014). Young children with developmental disabilities can be taught to choose stimuli or activities that reinforce (Watanabe & Sturmey, 2003) replacement behaviors to motivate the children to engage in them (Jolivette et al., 2001). This may help the children to predict a sequence of environmental events (Jolivette et al., 2001), thereby decreasing their disruptive behaviors (Romaniuk et al., 2002). Offering a choice of preferred stimuli or activities may provide the children with opportunities for increased teacher-child interaction while engaging in replacement behaviors (Romaniuk et al., 2002).

However, the results of previous studies were mixed between offering a choice of preferred stimuli and obtaining the preferred stimuli itself. Other findings have raised doubts about the factors accountable for preferred behavior change (Parsons, Reid, Reynolds, & Bumgarner, 1990). It is unclear whether it is choice or obtaining the preferred stimulus that offers the greatest advantage and leads to behavior change in function-based treatments. Research examining the effects of choice and no choice of preferred stimuli during function-based treatments is limited.

The aim of this study was to extend the research concerning function-based treatments in two directions. First, we aimed to determine the effectiveness of preferred engagement stimuli in reducing escape-maintained disruptive behaviors of pupils in kindergarten with developmental disabilities in inclusive elementary classes. Second, we investigated the effectiveness of choice and no choice of preferred stimuli in reducing the occurrence of escape-maintained disruptive behaviors via function-based treatments.

Method

Participants and Setting

Four pupils in kindergarten were chosen based on the following criteria: (1) following an Individualized Education Plan (IEP), (2) independent confirmation of DSM-IV criteria by at least two professionals, (3) presence of disruptive behaviors that consistently impeded learning processes, (4) enrollment in the inclusive kindergarten class, (5) contact from the school to the child's parents regarding disruptive behavior at least four times in three weeks, (6) no self-injurious behavior, and (7) parental consent to participation prior to the study.

Jaylynn. Jaylynn was a 7-year-old girl diagnosed with Down's syndrome (DS) and mild intellectual disability (ID). She received individualized speech therapy for 1 hour three times per week. The class contained 20 students, a teacher, and an aide. The teacher had 12-years of teaching experience in inclusive kindergarten classes and limited experience in FBA. Jaylynn's disruptive behavior included knocking objects off surfaces, touching children sitting behind her, frequent pounding on the desk, and leaving the assigned area. Her teacher used time-out as behavioral management. Her treatment was conducted in math class whole-group activities.

Marshall. Marshall was a 6-year-old boy diagnosed with autism spectrum disorder (ASD). He received social skills therapy for 1 hour four times per week as part of a small group. The class contained 17 students, a teacher, and an aide. His teacher had 9 years of teaching experience in inclusive kindergarten classes and limited experience in FBA. Marshall's disruptive behaviors included pushing tasks away, calling out, and refusing to follow instructions. His teacher used a token economy system as behavioral management. His treatment was conducted in reading class small-group activities.

Dylan. Dylan was a 7-year-old boy diagnosed with mild cerebral palsy (CP) and mild ID. He received speech therapy for 90 min three times per week. The class contained 21 students, a teacher, and an aide. The teacher had 8-years' teaching experience in inclusive kindergarten classes and limited experience with FBA. Dylan's disruptive behaviors included leaving the assigned area, grunting, and screaming. His teacher used the mystery motivator program for behavioral management. His treatment was conducted in reading class whole-group activities.

Ella. Ella was a 6-year-old girl diagnosed with attention deficit hyperactivity disorder (ADHD) and Tourette's syndrome. She was not taking medication during the study, and received social skills therapy for 1 hour three times per week as part of a small group. The class contained 20 students, a teacher, and an aide. The teacher had 11 years' teaching experience in inclusive kindergarten classes and limited experience with FBA. Ella's disruptive behaviors included rocking in her chair, crying, pushing materials, and leaving the assigned area. Her teacher used the mystery motivator program as behavioral management. Her treatment was conducted in science class small-group activities.

Functional Assessment Interview

Each teacher interviewed the parents of these subjects by using the Functional Assessment Interview (FAI) Form (O'Neill et al., 1997). The FAI is used to gather information about the history and description of disruptive behaviors, antecedent and consequent variables, setting events (i.e., medication, daily schedule, and sleep pattern), replacement behaviors, reinforcers (i.e., activities and stimuli), previous strategies, and communicative ability. Each interview was audio recorded. Following the FAI, a master's-level behavior analyst listened to the recording, determined the function of disruptive behavior, and rated it using a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

The researcher then administered the FAI Form to each teacher to gather additional information. The researcher did not read or listen to the FAI responses from the other teachers' interviews with parents. Each interview was audio recorded. Subsequent to the FAIs, the behavior analyst listened to the recordings, determined the function of disruptive behavior, and rated it using the same scale.

Direct Observation

During the study, teachers attended a 5 hour training workshop that included the provision of examples; modeling the correct operational definition of disruptive behaviors, replacement behaviors, specific antecedents, and specific consequences; identifying hypothesized functions via data source triangulation; using the Functional Analysis Observation (FAO) Form (O'Neill, Horner, Albin, Storey, & Sprague, 1990); and collecting data using event recording, which is a process used to document whether disruptive behavior occurred during a short observation period.

The behavior analyst also trained teachers to calculate conditional probabilities, which are determined by dividing the number of consequence and antecedent occurrences by the sum of the number of disruptive behavior occurrences and multiplying the result by 100. They also answered their questions and provided guidance and support as teachers observed and recorded descriptive behaviors, antecedents, and consequences during typical activities. Training continued until the teachers achieved 100% agreement for three consecutive sessions during naturally occurring activities.

Each teacher observed the subjects in seven 20-min sessions and continued observation until confidence in their ability to predict disruptive behavior was followed by a similar disruptive behavior pattern in the FAO form. The teachers then calculated the conditional probability of consequence and antecedent occurrences and interpreted the results independently to identify functions.

Using a video recording, the behavior analyst observed the subjects during the same observation period, recorded the consequences, antecedents, disruptive behaviors, and exact time on the FAO form, and calculated and interpreted the conditional probabilities to identify functions.

Inter-observer agreement (IOA) between the behavior analyst and each teacher was determined when they recorded the antecedents and consequences associated with a disruptive behavior independently within 10 seconds. IOA was calculated by dividing the number of agreements by the total number of disagreements and agreements.

Results of Functional Assessment Interview and Direct Observation

During the FAI, the behavior analyst identified escape as the function of Jaylynn's disruptive behavior, with a confidence rating of 4 (*agree*). During the FAO, the teacher and behavior analyst determined that her disruptive behaviors were followed by escaping the demand of participating in math class during whole-group activities. The IOA on the FAOs was high (range: 98.5–100%; mean: 99.5%).

During the FAI, the behavior analyst identified escape as the function of Marshall's disruptive behavior, with a confidence rating of 5 (*strongly agree*). During the FAO, the teacher and behavior analyst determined that his disruptive behaviors were followed by escaping the demand of participating in reading class during small-group activities. The IOA on the FAOs was high (range: 99–100%; mean: 99.6%).

During the FAI, the behavior analyst identified escape as the function of Dylan's disruptive behavior, with a confidence rating of 5 (*strongly agree*). During the FAO, the teacher and behavior analyst determined that his disruptive behaviors were followed by escaping the demand of participating in reading class during whole-group activities. The IOA on the FAOs was high (range: 97–100%; mean: 98.3%).

During the FAI, the behavior analyst identified escape as the function of Ella's disruptive behavior, with a confidence rating of 4 (*agree*). During the FAO, the teacher and behavior analyst determined that her disruptive behaviors were followed by escaping the demand of participating in science class during small group activities. The IOA on the FAOs was high (range: 97.4–100%; mean: 98%).

Brief Multiple-Stimulus Preference Assessment

Following direct observation, teachers attended a 2-h training workshop on conducting brief multiple-stimulus preference assessments (Carr, Nicolson, & Higbee, 2000) with the subjects to identify their six most preferred stimuli. The teachers assessed the subjects during three sessions.

They presented them with six stimuli (i.e., bingo, a maze, a coloring book, and jigsaw, crossword, and slider puzzles) selected from a reinforcer survey completed by the subjects' parents' and teachers. The teachers allowed the subjects to select the activity they most preferred. As the subjects chose a preferred stimulus, the teachers removed the chosen stimulus and did not replace it during the session. There was a 3-min break between sessions. The teachers calculated the number of times each preferred stimulus was selected.

Stimuli were ordered according to preference, from most to least preferred. Jaylynn selected bingo as her most preferred stimulus, followed by the maze, jigsaw puzzle, crossword puzzle, coloring book, and slider puzzles. Marshall selected the coloring book, followed by the jigsaw puzzle, maze, crossword puzzle, slider puzzles, and bingo. Dylan selected bingo, followed by the jigsaw puzzle, coloring book, slider puzzles, crossword puzzle, and maze. Ella selected the slider puzzles, followed by the jigsaw puzzle, coloring book, bingo, maze, and crossword puzzle.

Function-Based Treatment Design

Following the stimulus choice assessment, teachers attended an 8-h training workshop on offering choice and no choice of preferred stimuli during function-based treatments, which included the provision of simulated examples; modeling the correct implementation of treatment; and collecting data using momentary time sampling to record naturally occurring activities. The behavior analyst trained the teachers to design function-based treatment, ignore the subjects' disruptive behaviors, redirect them to activities with minimal interaction, and remind them that they would receive their preferred engagement stimulus if they followed the classroom rules for 30 min during the activity. The rules, with pictures, were posted on a board at the front of the classroom. The behavior analyst also trained teachers to assess treatment integrity data using checklists and create multiple treatment reversal design graphs of the subjects' progress.

The behavior analyst answered questions and provided assistance as teachers implemented the treatments. The behavior analyst explicitly reviewed the treatments with teachers before each class. They also trained them to calculate percentages for the occurrence of disruptive behaviors and recorded disruptive behavior independently during training. The behavior analyst shared treatment integrity data with teachers to provide performance feedback. Training continued until IOA scores were 100% for three consecutive sessions.

A comparison between choice and no choice of preferred stimulus during function-based treatment was performed using a multiple treatment reversal design, which consisted of the following: (A) baseline, (B) choice of preferred stimulus, and (C) no choice of preferred stimulus. Choice and no choice of preferred stimulus were counterbalanced across the subjects to minimize threats to internal validity and multiple treatment interference. Teachers reminded the subjects of which treatment would be used each day to ensure that they could differentiate between the two treatments.

Data were collected using the momentary time sampling recording divided into 10-second intervals for 30-min sessions. Baseline, treatment, and maintenance data were collected during whole-group activities in math (Jaylynn) and reading (Dylan) classes and small-group activities in reading (Marshall) and science (Ella) classes.

Baseline Sessions

Teachers led the typical activities. The treatment elements and preferred stimuli were not used during these sessions.

Choice Sessions (B)

The teachers did not modify antecedent stimuli to reduce the likelihood of those stimuli occasioning disruptive behavior. The subjects chose one preferred stimulus at the beginning of each session. If they followed the rules, at the end of the session they received their selected stimulus, contingent on their use of the replacement behavior. Those who did not follow the rules were told that they would get another chance in the next session. Teachers initially ignored the subjects' disruptive behaviors (for at least 30 seconds). If they were disruptive for longer than 2 min, the teachers were trained to redirect children to the activity and remind them of the available rewards.

No-Choice Sessions (C)

The teachers did not modify antecedent stimuli to reduce the likelihood of those stimuli occasioning disruptive behavior. The procedure for no-choice sessions was the same as that for choice sessions, but the teachers, rather than the kindergartners, chose one of the subjects' preferred stimuli.

Maintenance Sessions

Phases that were more effective were implemented for three weeks at the end of the final phase; data were collected daily.

Inter-observer Agreement

Using a real-time video cassette recorder, the behavior analyst recorded the disruptive behaviors and exact time for 70% of each phase. The behavior analyst then calculated IOA by dividing the number of agreements by the number of observed intervals and multiplying this by 100.

Treatment Integrity

Teachers completed a checklist for all treatment and maintenance phases. The

behavior analyst completed the checklist for 70% of these phases and calculated treatment integrity by dividing the accurately completed elements by the total number of treatment elements and multiplying this by 100. Treatment integrity IOA was calculated by dividing the number of agreements by the total number of treatment elements and multiplying this by 100.

Social Validity

After all sessions, teachers completed the Treatment Acceptability Rating Form-Revised (TARF-R; Reimers, Wacker, Cooper, & DeRaad, 1992) to assess treatment acceptability for the classes. The questionnaire consisted of 17 questions assessing each treatment's disruption/time required, side effects, effectiveness, willingness, cost, and reasonableness, responses for which were indicated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The total score ranged from 17 to 119.

Results

Jaylynn

During five baseline sessions, Jaylynn's escape-maintained disruptive behavior averaged 89% (range 85–90%). When Treatment B was implemented for 10 sessions, her disruptive behavior decreased considerably to an average of 3.9**% (**range 2–6%). With a return to the baseline phase for three sessions, her disruptive behavior increased to levels similar to those of the first baseline measurement, with a mean of 90%. When Treatment C was implemented for 10 sessions, her disruptive behavior gradually decreased to 14.1% (range 11–26%). With a return to the baseline phase for three sessions, her disruptive behavior remained at an average of 85%. In the maintenance phase, her disruptive behavior decreased again to 0.53% (range 0–2%). The IOA for disruptive behavior was 100% for each phase. Treatment integrity IOA and average treatment integrity were 100% during the treatment and maintenance phases. Using the TARF-R, her teacher rated Treatment B at 119 and Treatment C at 110.

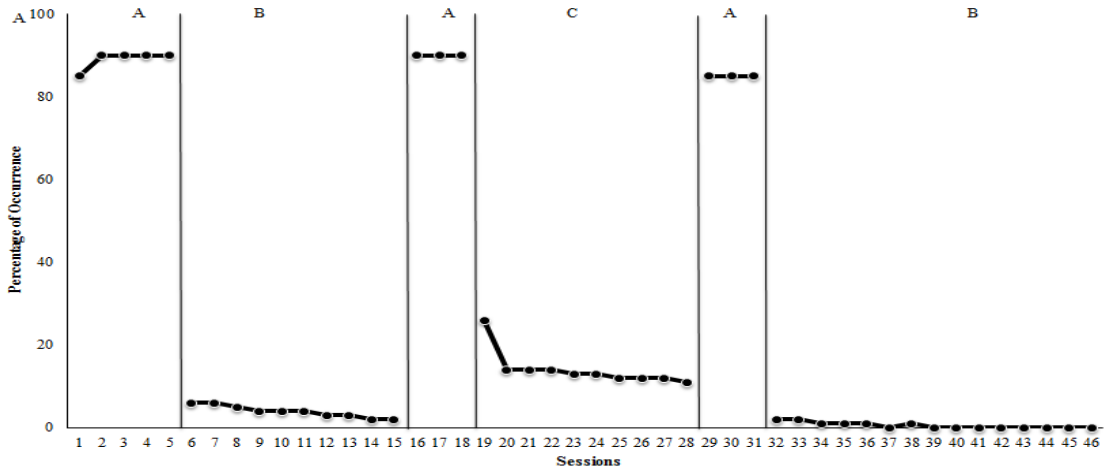

Figure 1. Percentage of occurrence of disruptive behavior for Jaylynn during baseline, choice treatment, no choice treatment, and maintenance phases.

Marshall

During five baseline sessions, Marshall's escape-maintained disruptive behavior averaged 76% (range 70–80%). When Treatment C was implemented for 10 sessions, his disruptive

behavior decreased gradually to an average of 14.6% (range 11–31%). With a return to the baseline phase for three sessions, his disruptive behavior increased to levels similar to those of the first baseline measurement, with a mean of 80%. When Treatment B was implemented for 10 sessions, his disruptive behavior decreased considerably to 3.3% (range 2–5%). With a return to the baseline phase for three sessions, his disruptive behavior remained at an average of 78.33% (range 75–80%). In the maintenance phase, his disruptive behavior continued to decrease to 0.33% (range 0–2%). The IOA for disruptive behavior was 100% for each phase. Treatment integrity IOA and average treatment integrity were 100% during the treatment and maintenance phases. Using the TARF-R, his teacher rated Treatment B at 117 and Treatment C at 112.

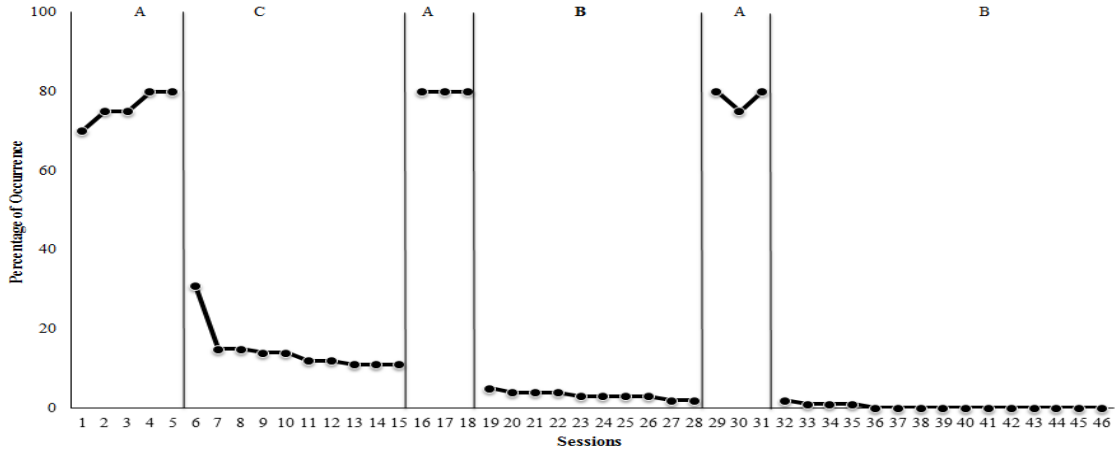

Figure 2. **Percentage of occurrence of disruptive behavior for Marshall during baseline, choice treatment, no choice treatment, and maintenance phases.**

Dylan

During five baseline sessions, Dylan's escape-maintained disruptive behavior averaged 66% (range 60–75%). When Treatment B was implemented for ten sessions, his disruptive behavior decreased considerably to 3.5% (range 1–9%). With a return to the baseline phase for three sessions, his disruptive behavior increased to levels similar to those of the first baseline measurement, with a mean of 75%. When Treatment C was implemented for 10 sessions, his disruptive behavior gradually decreased to 15.3% (range 10–30%). With a return to the baseline phase for three sessions, his disruptive behavior remained at an average of 70%. In the maintenance phase, his disruptive behavior decreased again to 0.27% (range 0–1%). The IOA for disruptive behavior was 100% for each phase. Treatment integrity IOA and average treatment integrity were 100% during the treatment and maintenance phases. Using the TARF-R, his teacher rated Treatment B at 118 and Treatment C at 109.

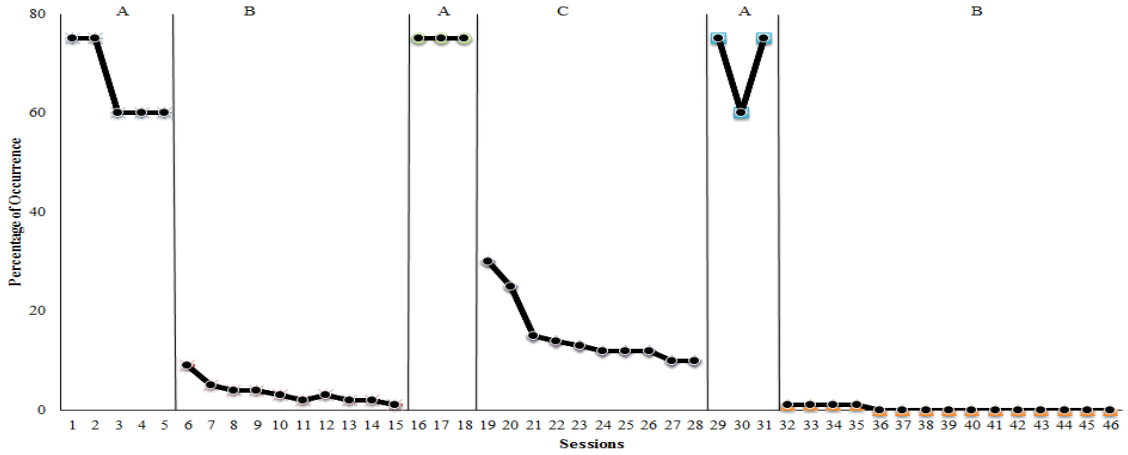

Figure 3. Percentage of occurrence of disruptive behavior for Dylan during baseline, choice treatment, no choice treatment, and maintenance phases.

Ella

During five baseline sessions, Ella's escape-maintained disruptive behavior averaged 60% (range 55–65%). When Treatment C was implemented for 10 sessions, her disruptive behavior gradually decreased to 15.1% (range 40–10%). With a return to the baseline phase for three sessions, her disruptive behavior increased to levels similar to those of the first baseline measurement, with a mean of 61.7% (range 55–65%). When Treatment B was implemented for 10 sessions, her disruptive behavior decreased considerably to 3.7% (range 2–6%). With a return to the baseline phase for three sessions, her disruptive behavior remained at an average of 65%. In the maintenance phase, her disruptive behavior continued to decrease to 0.27% (range 0–1%). The IOA for disruptive behavior was 100% for each phase. Treatment integrity IOA and average treatment integrity were 100% during the treatment and maintenance phases. Using the TARF-R, her teacher rated Treatment B at 116 and Treatment C at 100.

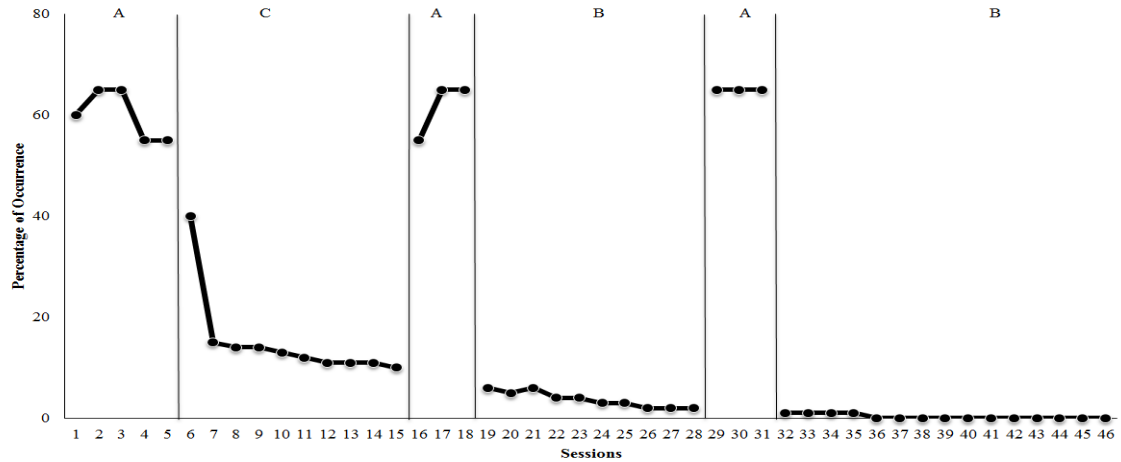

Figure 4. Percentage of occurrence of disruptive behavior for Ella during baseline, choice treatment, no choice treatment, and maintenance phases.

Discussion

The current study examined the effect of choice and no choice of preferred engagement stimuli on disruptive behavior exhibited by four subjects in kindergarten with developmental disabilities during function-based treatment and replicated and extended the findings of previous studies. The results of this investigation may expand our knowledge with

respect to whether choice or no choice of preferred engagement stimuli is most effective for subjects with developmental disabilities. Both the choice and no-choice phases were conducted in a counterbalanced manner across subjects to minimize treatment-order effects. Jaylynn and Dylan received the choice phase (B) first, whereas Marshall and Ella received the no-choice phase (C) first.

All subjects' disruptive behavior decreased in both the choice and no-choice phases, as evidenced by direct observation during an ongoing classroom routine. A decrease in disruptive behavior during both phases was observed for all subjects. This may have occurred due to positive reinforcement (i.e., via preferred engagement stimuli) contingent on replacement behaviors resulting in a reduction in escape-maintained disruptive behavior (Geiger, Carr, & LeBlanc, 2010), which counteracted the function of the behavior. When reinforcers that counteract the function of disruptive behavior are identified, function-based treatments can be designed to reduce the occurrence of that behavior.

However, Jaylynn and Dylan demonstrated reductions in disruptive behavior attempts when the choice phase was introduced. When the opportunity to choose was withdrawn in the no-choice phase, Jaylynn's and Dylan's levels of disruptive behavior increased in the first two to three sessions, and then decreased. When the choice phase was reintroduced for all subjects in the maintenance phase, they demonstrated the lowest levels of disruptive behavior.

The reduction of disruptive behavior differed between the two phases. There was a greater reduction in disruptive behavior in the choice sessions relative to that of the no-choice sessions. The opportunity to choose stimuli positively influenced disruptive behavior (Jolivette et al., 2001) of subjects in kindergarten. with developmental disabilities. This may have occurred because the opportunity to choose may have provided positive reinforcement, increased the likelihood of replacement behavior, and decreased the likelihood of future disruptive behavior (Burton, 2012) in all of the subjects studied. Therefore, escape behavior was less valuable, as the subjects were offered their preferred stimuli. This is because gaining chosen stimuli decreased disruptive behaviors before the subjects attempted escape-maintained disruptive behavior at the beginning of each choice treatment session (May & Howe, 2013).

Brief multiple-stimulus preference assessment (Carr et al., 2000) was used to identify high- and low-preference engagement stimuli in natural ongoing activities. Relative to other types of assessment, this brief assessment was more time efficient and equally effective (Schlenker-Korb, 2014). The subjects' identification of preferences is consistent with findings from studies indicating that children with developmental disabilities are able to correctly identify their preferred stimuli (Parsons & Reid, 1990). In the current study, the brief assessment identified strongly preferred stimuli that impeded escape-maintained disruptive behavior.

Treatment integrity data for all choice and no-choice sessions demonstrated that they were all conducted with high fidelity. Treatment integrity results showed that appropriate administration of treatments was strongly correlated with a reduction in escape-maintained disruptive behaviors. Teachers could analyze behavior change via regular monitoring of treatment and disruptive behavior. Regular collection of treatment integrity data allowed teachers to assess the internal and external consistency of all phases easily (Gresham, Gansle, & Noell, 1993), as treatment was delivered over time (Horner et al., 2005).

Teachers rated the appropriateness, feasibility, and design of the choice and no-choice treatments for each subject. Using the TARF-R, teachers rated both treatments highly. However, they rated choice treatments as preferable and more socially valid, effective, and acceptable relative to no-choice treatment. The teachers were very willing to implement

choice of preferred engagement stimuli during maintenance phases and would continue to implement it throughout the year.

Limitations and Future Research

This study was subject to several limitations. First, implementation of choice of preferred engagement stimuli was limited to four inclusive kindergarten classes. Therefore, the observed reduction in disruptive behavior may have been due to the characteristics of the classroom setting. Future research should replicate these results in dual environments, such as school and home (Dunlap et al., 2006), which could result in long-term behavior change. Second, FBA was used to verify the function of the subjects' disruptive behavior. However, even though the occurrence of escape-maintained disruptive behaviors decreased, the hypothesis concerning this function may have been inaccurate. Future studies conducted in school settings should replicate these findings using functional analysis to verify escape as a primary function of disruptive behaviors. Third, data were collected for only four subjects with different diagnoses displaying escape-maintained disruptive behavior; therefore, the generalzsability of the results is limited. Future research focusing on the replication of this study with inclusion of different diagnoses and behaviors is required. Fourth, the brief multiple-stimulus preference assessment was conducted in only three sessions prior to administration of function-based treatments. Repeating assessment sessions during the study may be beneficial in determining whether children's engagement stimulus preferences changed (Burton, 2012). Future studies should replicate these findings to examine the possibility of changes in preference.

In conclusion, through the use of FBA, preference assessments, and function-based treatments, choice of preferred engagement stimuli appears to be effective in reducing escape-maintained disruptive behavior of pupils in kindergarten with developmental disabilities. As teachers in this study implemented choice of preferred engagement stimuli during naturally ongoing activities, early childhood teachers could prevent the occurrence of disruptive behavior via learning activities.

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