

***The Classroom Infrastructure and the Early Learner: Reducing Aggression During Transition Times***

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***Abstract***

High levels of aggressive behaviors were observed during the transition times in two self-contained special education classrooms: a kindergarten and pre-kindergarten. The present case studies examine how modifying the classroom infrastructure impacts students' aggressive behavior. Teachers were assisted on the usage of select modifications (visual cues and carrels). Data were collected during pre-experimental, baseline, intervention 1, and intervention 2. Results indicate that modifying the classroom environment decreased aggressive behaviors during transition times by as much as 12% from the beginning of the study. The change in aggressive behavior was moderate and teachers perceived the intervention as having a positive impact on students' learning and their ability to teach. Implications for practitioners are discussed.

***The Classroom Infrastructure and the Early Learner: Reducing Aggression During Transition Times***

Today's classrooms are complex; teachers not only teach, but simultaneously manage the behavior of their students, supervise paraprofessionals, strive to incorporate the mandated curriculum, participate in high-stake testing, and negotiate advanced technology (e.g., Smart Boards, document cameras, laptops, iPads). Although not often considered complex, the classroom infrastructure contributes to the daily challenges teachers attempt to balance.

Infrastructure is defined as "the underlying foundation or basic framework" (Merriam-Webster's Online Dictionary, 2010). Thus, the classroom infrastructure consists of many foundational components, including the furniture and structural layout of the classroom (e.g., desks, tables, materials, partitions). Depending on how the classroom infrastructure is designed, the system will either function efficiently or not. A poorly designed classroom infrastructure impacts students' and teachers' behaviors. Lawry, Danko, and Strain (1999) affirm, "Often, teachers are unaware that the more subtle aspects of the classroom's physical and instructional environment are operating to maintain, if not exacerbate, these challenging behaviors" (p. 49). Teachers who have students with high levels of challenging behaviors must examine their classrooms to determine if the infrastructure is negatively impacting behavior. If so, modifying the infrastructure may provide students with the information they need to meet behavioral expectations, during

more unstructured and possibly demanding parts of the school day such as transition time.

Young children transition (move from activity to activity) twelve to fourteen times a day (Rogers, 1988). Challenging behaviors (i.e., disruption, aggression, non-compliance) often occur during these transitions (Buck, 1999). Transitions involve following teacher directions (standing in line), putting away materials before they are finished (clean-up), or readying themselves to move from a preferred (recess) to a less preferred activity (literacy circle) (Sainato, 1990). Designing the infrastructure with transitions in mind provides teachers with a behavior management tool *and* allows children to successfully navigate the classroom (Bullard, 2010; Hemmeter, Ostrosky, & Fox, 2006). Whereas, a poorly designed infrastructure may negatively affect children's ability to transition. A strategically designed infrastructure can provide children with informational cues that give expectations for appropriate behavior during these times and throughout the day (Kemple, 2004). For example, footprints placed in a line leading to the door clue children on where to stand while lining up to transition out of the classroom. A well-designed classroom infrastructure is critical; however, it may not be sufficient to sustain appropriate student behaviors. Additional support such as coaching the classroom teachers can strengthen their knowledge base and aid in a more effective learning environment (Guardino & Fullerton, 2010).

A coach develops or reinforces a skill or skill set with teachers. Coaches are able to increase teachers awareness of strategies used in conjunction with the modifications. For example, a teacher might need a strategy to ensure students check their individual chair bags at the end of the day in preparation for the following morning. Coaching is an effective professional development tool providing collaborative training that does not impinge on teaching time (Guskey, 2009). Collaborative coaching allows the teacher and the coach (e.g. peer teacher, veteran teacher, mentor, or consultant) to analyze the problem, work together towards a solution and then decide the type of coaching needed: "live" or "virtual". For purposes of our study the researchers took on the role of the coach. Live coaching involves modeling the strategies, providing visual or verbal cues, and guiding the teacher to use the modification as intended. Virtual coaching takes place via email or handwritten notes left for the teacher to read and then implement the suggested strategies. Due to the varying years of experience and education of teachers, coaching differs depending upon their existing skills.

Teachers are often provided with evidence-based strategies through workshops, in-service seminars, and conferences, yet they may not implement these strategies without additional support. Coaching is a direct form of teaching educators to use new strategies effectively. Unlike a workshop or conference this is a dynamic intervention with the teacher actively increasing their skill set. When teachers are coached to implement specific evidence-based practices, effects of the intervention increase; thus having a greater impact on student outcomes (Yerkes, 2001). Matheson and Shriver (2005) found that students' compliance and academic behaviors improve significantly after teachers receive coaching in the form of training and modeling.

## **Purpose of the Case Studies**

The purpose of the case studies was to investigate the effectiveness of modifying the classroom infrastructure on the aggressive behavior of young children in two early childhood classrooms. The participating teachers were provided with instruction in creating a safe infrastructure that sets the occasion for appropriate behavior. Two research questions were addressed: (1) Does a strategically arranged classroom infrastructure influence the aggressive behavior of young children during transition time? (2) Does coaching teachers increase the effectiveness of the modifications on students' aggressive behavior?

## *Methods*

### **Case Study Participants and Setting**

The participants were two early childhood teachers and students with varying disabilities enrolled in a kindergarten (Teacher 1, Classroom 1) and prekindergarten for children (Teacher 2, Classroom 2). The school serves children from pre-kindergarten through grade five and is located in an urban setting in Northeast Florida. The children were in school 6.5 hours per day. The participating teachers were selected based on a request by the principal of the school who expressed concern about the aggressive behavior displayed by children in these classrooms.

Teacher 1's kindergarten (age range five-six years) had nine students, eight boys and one girl. All the children had an Individualized Education Plan (IEP) with a diagnosis of developmental delay. All the children were in kindergarten for a second year. Due to the high levels of challenging behavior the children were not, as is typical in kindergarten, allowed to participate in center-based learning. Rather the children spent the school day in teacher or paraeducator directed activities. The children demonstrated a variety of verbal and non-verbal aggressive behavior including hitting, kicking, biting, spitting, stabbing with writing utensils, and cursing.

Teacher 1 had a bachelor's degree in education and a master's degree in counseling. This was her first experience teaching young children as well as children with developmental delays. Teacher 1's kindergarten classroom was arranged with tables, as well as desks in dyads and various curriculum materials scattered throughout the room.

Classroom 2's pre-kindergarten (age range three-four) had eight students, seven boys and one girl at the start of the study. By the end of the study, she had 12 students, ten boys and two girls. As with the first class, all children had a diagnosis of developmental delay, each having an IEP. The children demonstrated three aggressive behaviors: hitting, snatching toys, and pushing.

Teacher 2 had a master's degree in children and family counseling with a concentration in art therapy. She had six and a half years experience teaching art in the general education setting K-12. This was her first year teaching young children with developmental delays. As is expected in the preschool setting the children were taught in

large and small groups with center-based learning accounting for portions of the day. Classroom 2's pre-kindergarten classroom had a few centers (family life, library, blocks and puzzles), but they were not clearly defined and the children were observed staying near the teacher/paraprofessional or wandering from area to area.

While aggressive behavior occurred throughout the day, transitions (a time when one activity is finished and another begins) were a time when the highest levels of aggressive behaviors occurred and therefore, were chosen as the time for data collection.

### **Defining and Measuring Aggressive Behavior**

Aggressive behavior was defined as acts of violence towards, self, others and property (Dodge, Coie, & Lynam, 2006). The following behaviors were recorded as aggression: hitting, kicking, biting, pushing, snatching materials, stabbing with writing utensils, and cursing. Aggressive behavior was measured using a partial interval recording system. Partial interval recording was chosen as it allows for recording of the percentage of aggressive behaviors occurring during transition times. Data collection consisted of 10 minute sessions divided into forty 15-second intervals. If any child in the classroom exhibited aggressive behavior within the 15-second interval, an X was recorded. If aggressive behavior did not occur during the 15-second interval, an O recorded.

Aggressive behavior was calculated by adding the number of intervals when aggression occurred and dividing it by the total number of intervals for the observation period. This average was multiplied by 100 to provide the percentage of aggressive behavior occurring during the observation period. Data was analyzed using descriptive statistics: mean, median, and mode. Observations were conducted a minimum of three times a week by a trained data collector.

The data collector was a 4<sup>th</sup> year special education undergraduate researcher, from a state university teacher preparation program trained by the researchers (first and second authors) of this study. Data training took place over the course of two weeks prior to beginning baseline data collection. The researchers met individually and together with the undergraduate researcher to first observe the behaviors occurring in the classroom, second discuss behaviors that were observed, and third practice collecting data. Once the researchers and the undergraduate researcher reached over 85% agreement on three consecutive data collection periods, the undergraduate researcher began collecting baseline data.

### **Inter-rater Reliability**

The researchers served as the inter-raters for this study. Inter-rater data were collected on 25% of the total sessions. The researchers individually met the undergraduate researcher to collect data during transition times. The overall inter-rater reliability was high, averaging 93% (ranging from 77-100%).

### **Procedures and Design**

The case studies were conducted across four phases: pre-experimental, baseline, intervention 1 (modifications), and intervention 2 (coaching). Data were collected in all phases with the exception of pre-experimental.

**Pre-experimental.** Prior to beginning data collection, the researchers met with the teachers to obtain their consent and discuss the overall purpose of the study. Following this meeting, the researchers spent ten days in each classroom observing behaviors. This phase also served as a habituation period prior to direct observations of teacher and child behaviors. Habituation is necessary to decrease the likelihood that the teachers or children will change their behaviors in the presence of the researchers.

During this phase, the researchers identified transition activities as a time when aggressive behaviors were most often observed. The teachers confirmed this was their most challenging time. Due to the afternoon routine of lunch, recess, and special classes, morning transitions were chosen.

**Baseline.** During the baseline phase the children's behaviors were observed at the identified transition times. Children and teachers participated in their regular routines ("business as usual"). Data were gathered on the children's behaviors (as described previously). Baseline data began on the same day in both classrooms. Data were collected until a stable baseline was established in classroom 1. However, in classroom 2, baseline data was unstable, yet the teacher and principal requested that the intervention take place.

**Intervention 1 (Modifications).** Following baseline, the two researchers met with the teacher individually for approximately 30 minutes. During the meeting a list of research-based modifications was shared with the teacher. In collaboration with the researchers, the teacher chose the modifications that best fit her classroom as shown in Table 3. The modifications included making unused material inaccessible, providing small group and individual work space, rearranging quiet/noisy centers and providing visual cues for lining up to exit the classroom. Given the dynamic nature of the intervention each teacher chose the modifications based on their individual and students' needs.

Following the meeting, the classroom infrastructures were modified by the teacher and the researchers when no children were present. Modifications took an average of five hours per classroom. During this time teachers were encouraged to clarify their needs, make additional modifications, or reject suggested modifications. For example, Teacher 1 noted that large group time resulted in high levels of aggression. She wanted small group and individual workspace for her kindergarten children. The researchers suggested carrels at dyad workspaces. This allowed for the tables to be quickly changed from dyad to individual workspace thus eliminating confusion when transitioning from group time to work time. Teacher 2 wanted a larger block area as this was a favorite area for her children. It became very crowded during center time making the transition clean-up very difficult for the children. The researchers walked her through the classroom discussing each learning center and together decided to remove two unused centers to increase the space for block play.

Following the implementation of the modifications, data were immediately collected the next school day when children returned to the classroom. Children's behaviors were observed and recorded to measure the influence of the modifications on aggressive behavior.

**Intervention 2 (Coaching).** Based on a previous study by Guardino and Fullerton (2010), the researchers anticipated the need to provide assistance to the teachers on implementing the modifications *if* aggressive behaviors increased following intervention. During the intervention 2 (coaching), the researchers met with the teachers coach them on how to effectively use the modifications. To maintain treatment fidelity one of the researchers served as the coach. Data collection was ongoing during the intervention 2 (coaching). In keeping with the needs of each teacher, they chose the type of coaching they preferred, live or virtual. Teacher 1 preferred "live" coaching. The researchers modeled a mini-lesson, transitioning (moving from activity to activity) the children from a newly created large group area (with assigned seating) to newly created small group, and individual work spaces. Assistance for Teacher 1 involved the researcher teaching one fifteen-minute session and cueing the teacher with a whisper or a non-verbal prompt during three separate fifteen-minute sessions. The total assistance time was approximately one hour. Teacher 2 preferred written guidance (virtual) following researcher observation of transition from center activities to clean-up and hand washing. For example, the researcher wrote a note to Teacher 2 that suggested she provide a five minute warning, use her transition bell to initiate the transition, and remind the children to stand on paw prints in front of the sink while waiting. Following three observations of transitions a note was written. Each observation/note session took 10 minutes for a total of 30 minutes.

**Social Validity.** After the study was completed, the researchers interviewed and surveyed the teachers regarding which modifications they thought were most helpful in reducing aggressive behaviors. The interview consisted of ten questions, two pertaining to aggressive behaviors, and the remaining focusing on the acceptability of the modifications. The interview data were analyzed by reporting the qualitative trends in the interviews.

The survey lists the modifications made in each classroom, the teachers to rate the modifications from "1= most effective" to "5=least effective". The survey data were analyzed by comparing the rankings of the modifications between the two classrooms.

### ***Results***

**Intervention 1 and 2.** The transition activity for Classroom 1 was moving from large group morning carpet time to small group reading instruction and individual literacy work. The modifications included an expansion of the circle area and adding tape to designate seating areas for each child. Figure 1 photographs illustrate the modification described above. Additional modifications were completed such as the curriculum centers were removed as the children had dumped, broken, or taken the materials.

Figure 1. Before and After Pictures of Classroom 1.



In Classroom 1 during baseline, aggressive behavior averaged 27% (25-28%). After intervention 1 (modifications) occurred, aggressive behaviors decreased to 0% and quickly escalated to 20% by session 5 (see Table 1). After session 6, intervention 2 (coaching), began and aggressive behavior decreased to an average of 15% (10-18%) for the remainder of the study, a notable 12% decrease from baseline.

In Classroom 2, the children transitioned from a group activity to an individual activity (washing hands and lining up for lunch). Infrastructure changes included defining the center areas and creating designated line up “paws” for each child when exiting out of the classroom. Figure 2 illustrates the changes described above.

Figure 2. Before and After Pictures of Classroom 2. (center and line-up areas)







**Interview.** Teacher 1 reported the classroom felt “more spacious, more welcoming”. After the modifications were made, during transition time the children did not wander around the classroom taking or dumping supplies because the unused curriculum materials were organized on shelves that were covered by solid fabric. They went directly from the carpet to the assigned work space. She perceived the children to be “on-task more”. For example, she explained now that the children had a defined place to sit during circle time they were more attentive at the start of transition. In addition, the individual desk carrels allowed the children to quickly transition to their own space, work in their own space and work “longer” and “better”.

Teacher 2 stated the intervention made a “big improvement” that specifically helped the “reduction of off task behavior” and reduced “the number (of) non-functional materials which would “create aggressive ways to use them.” Once the materials were eliminated, aggression decreased. She reiterated at the end of her interview that she was “seeing more positive behaviors, less aggression, more follow through, more ability to take turns, independence, and more success in transition from one activity to a completely new one.” Table 2 is a summary of the interview responses.

**Survey.** Teacher 1 reported the intervention was minimally intrusive, she would recommend it to other teachers, and she would continue to use the modifications. She was uncertain as to the academic gains her children made as she felt she needed more time to determine these effects. However, she was certain that the modifications reduced individual and total classroom aggressive behaviors.

Teacher 2 reported similar findings to that of Classroom 1. She scored the intervention as minimally intrusive. She agreed that she would both recommend it to other teachers and continue to use the modifications after the study had concluded. Teacher 2 reported that the modifications reduced individual and total classroom aggressive behaviors. However, she was unable to report individual academic gains as the survey was conducted too soon after the completion of the intervention, approximately 6 weeks.

### *Discussion*

Transitions are an especially difficult time for young children as they must finish an activity, follow teacher directions, and ready themselves for a new activity (Sainato, 1990). Additionally, teachers are not always focused on the children as they are finishing an activity and readying themselves for the next. In Classroom 1 there was a significant decrease in aggressive behavior following the implementation of the intervention. Although the effect of the modifications was not as robust in Classroom 2, decreases in children's aggressive behavior occurred when transitioning from center activities to clean-up and hand washing.

Findings from Classroom 1 suggest that the coaching impacted the teacher's ability to use the intervention strategy more effectively. Furthermore, during the interview she indicated that the intervention was neither invasive nor comprised of false promises. Rather, the intervention provided her with the support and information needed to

implement effective research-based classroom modifications.

Interestingly, in Classroom 2 the data do not show an immediate and great decrease in aggressive behavior. Yet, the teacher indicated that she believed the intervention was effective. There may be several reasons for the difference in outcomes across the two classrooms. First, the populations differed. The children in classroom 2 were younger with more severe and varied disabilities in comparison to classroom 1. Additionally, the number of adults in classroom 2 fluctuated from one to four throughout the study. Additional adults included volunteer parents and service providers. The number of children also fluctuated.

Five sessions were eliminated from the data analysis because of the fluctuating adult presence. For example, when more adults were present other than the teacher and the paraprofessional aggression dramatically reduced because of 1:1 support for children (sessions 8 & 10). Sessions where the paraprofessional was absent leaving the teacher alone caused atypically high aggressive behavior across the classroom because of an increased ratio of children to teacher (sessions 15, 16, & 19). After the teacher received coaching, aggressive behavior decreased an additional 5% from the beginning of intervention 1 (modifications).

### **Limitations**

Originally, we had planned to have three classrooms participate in this study to meet the quality indicators of single subject research specified by Horner, Carr, Halle, McGee, Odom, and Wolery (2005). However, one of the teachers withdrew from the study leaving the design as data based case studies. Due to the small sample size the results cannot be generalized to other classrooms.

### **Implications for Classroom Practice**

The classroom environment is a complex infrastructure comprised of the physical layout of furniture and belongings. The infrastructure impacts important facets of the day, such as routines, transitions, and learning opportunities. The findings of both case studies support that teachers and children benefited from modifying their classroom infrastructure. Infrastructure changes in two early childhood classrooms decreased the aggressive behavior of young children during targeted transition times. Although decreased aggressive behavior was recorded without coaching, the intervention was most effective when the teachers received coaching, an average of 45 minutes. This is consistent with previous research showing that teachers of young children need training on how to work with young children who have challenging behavior (Hemmeter, Santos & Ostrosky, 2008).

Aggression in young children can be an indication of a serious problem and is recognized as a predictor of violent behavior and other long-term risk factors such as familial abuse, depression, and violent crimes (Tremblay et al., 2004). Many young children display normative misbehavior due to an inability to regulate emotions and undeveloped

language skills (Kostelnik, Whiren, Soderman & Gregory, 2009). However, as expressive language and social-emotional skills develop, most young children are able to use other strategies to resolve conflicts, and physical aggression typically decreases upon entry into school (Levin, 2003). When prekindergarten and kindergarten students do not “outgrow” aggressive behavior additional support is often needed to deal with daily frustrations, especially during transition times.

Modifying the classroom infrastructure is an effective strategy that allows children to manage their own behavior and provides teachers with additional behavioral support. There are several modifications to the classroom infrastructure that can be made to help reduce aggressive behaviors. One modification will not eliminate aggressive behavior; however, implementation of multiple modifications may help to discourage the behaviors instead of responding to them after they occur. Structuring the classroom to support positive behavior is an unobtrusive, preventative intervention, and supports student and teachers equally.

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## Tables

Table 1

Classroom	Baseline	Intervention 1 (Modifications)	Intervention 2 (Coaching)
Classroom 1			
Mean	27%	17.5%	15%
Median	28%	15%	15%
Range	25-28%	0-20%	10-18%
Classroom 2			
Mean	16%	15%	10%
Median	16.5%	18%	11%
Range	3-29%	4-21%	0-22%

*Mean, Media, and Range of Challenging Behavior*

Table 2

*Interview Responses*

Questions	Teacher Responses
What did you like most about the intervention?	<p>T1-“I have more time to teach...Love the carrels, everyone has a place to go after transition”</p> <p>T2-“provided more on task behavior and start and complete tasks as in easy cleanup of a material a student chose to work with.”</p>

Do you think your students have benefitted from having their classroom modified?

T1-“More spacious and welcoming...children stopped wandering around the room...Children had their own space and could focus on learning-they weren’t hitting each other”.

T2-“Increased positive behavior in the classroom...the modification changed behavior from off task to more on task, the ability to start and complete something, and to follow directions which many of these areas was a real struggle for students in the classroom before the modification...Helped with making transitions more graceful and decreased time it took to transition from one activity to the next.”

In what ways do you think other teachers can benefit from this intervention?

T1-“It is good having people to do research with...having support made me open to change.”

T2-“The intervention could improve their classroom management skills...it supported students to be more independent in the room because they knew what expected of them.”

Table 3

*Modifications, Rationale, and Perceptions of Impact of the Modifications*

Modification	Rationale	Teacher’s Perception Likert Scale from 1 to 5 (1= strongest effect)	
		Classroom 1	Classroom 2
Shelves with materials were covered with curtains to reduce visual stimuli and access to materials (Dye, Baril & Bavelier, 2007; Guardino & Fullerton, 2010; Neville & Lawson, 1987; Proksch and Bavelier, 2002)	Children were going to shelves, mixing and throwing materials	1	1



Reduced Furniture (Evans & Lovell, 1979; Weinstein, 1979)	Caused congestion. Children used extra furniture inappropriately.	1	1
Individual work area defined (Evans & Lovell, 1979; Proshansky & Wolfe, 1974)	Children would fight over materials and interfere with others workspace	1	1
Created barriers from pre-existing furniture (Evans & Lovell, 1979; Gump, 1974; Proshansky & Wolfe, 1974)	Children did not have clearly defined boundaries and roamed from place to place	2	1
Sufficient space for group & large group activities (Fullerton & Guardino, in press)	Children were hitting one another because the work spaces were too small	1	1

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