

## RESEARCH-TO-PRACTICE SUMMARY

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### Improving Behavioral Regulation in Preschool

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In this study, we share findings from a preschool intervention program using circle time games to help children practice behavioral regulation, a set of skills that lays the foundation for school readiness and academic success. We looked at how children's behaviors during intervention playgroup sessions was related to how much they benefited from the intervention and examined whether children's behaviors "spilled over" to other children's participation. Developing programs that help preschoolers practice behavioral regulation skills may help lay the foundation for early learning and later academic success.

"School readiness" has become a hot topic in recent years with preschool being identified as a critical time to help children develop the skills they need to be successful in school. Even President Obama highlighted the need to make "high-quality preschool available to every single child in America" in his 2013 State of the Union address. So what are the skills children need to be successful in school? And how do we teach these skills in preschool? A growing body of research has highlighted the importance of self-regulation for both short- and long-term academic achievement (McClelland, Acock, Piccinin, Rhea, & Stallings, 2013; McClelland, Cameron, Connor, et al., 2007). In fact, teachers name self-regulation skills, like paying attention and following directions, as critical skills for children to have when they make the transition to kindergarten (Rimm-Kaufman, Pianta, & Cox, 2000).

#### Behavioral Regulation and School Readiness

There are many different aspects of self-regulation, including cognitive, behavioral, and emotion regulation. In this paper, we are focusing on one aspect of self-regulation: behavioral regulation. Behavioral regulation is the integration of three regulatory skills: attentional flexibility, working memory, and inhibitory control (McClelland, Cameron, Wanless, & Murray, 2007). Attentional flexibility helps children focus on what is important and ignore distractions (Rueda, Posner, & Rothbart, 2005). Working memory allows children to keep information in mind so that they can

follow instructions and complete multi-step tasks (Adams, Bourke, & Willis, 1999). Inhibitory control is the ability to stop an automatic response (e.g., running outside when the bell rings) and choose another response instead (e.g., stopping to put toys away first) (Rennie, Bull, & Diamond, 2004). Research has indicated that children's behavioral regulation skills in preschool predict a number of academic outcomes, including preschool and elementary school reading and math scores and even high school and college completion rates (Blair & Razza, 2007; McClelland et al., 2013). Conversely, studies show that children who struggle with behavioral regulation have trouble succeeding in classroom settings and are at risk for academic difficulties (Ladd, 2003).

## Behavioral Regulation and Preschool

Preschool is an important time for developing behavioral regulation because it is during preschool that children experience significant growth in the pre-frontal cortex, the part of the brain related to behavioral regulation (Blair, 2002). Studies show that behavioral regulation can be improved with practice. Because more than 80% of children attend preschool, preschool programs may be an ideal environment to promote these skills and reach a majority of children before kindergarten (Denton Flanagan & McPhee, 2009). In recent years, a number of interventions have emerged focused on promoting school readiness. Many of these programs emphasize self-regulation as well as early academic skills. Some examples of intervention programs include Tools of the Mind (Bodrova & Leong, 2009), Promoting Alternate Thinking Strategies (PATHS) (Domitrovich, Cortes, & Greenberg, 2007), Second Step (Committee for Children, 2013), the Incredible Years (Webster-Stratton, Reid, & Stoolmiller, 2008), and the Kindergarten Readiness Study (Tominey & McClelland, 2011). Most of these programs have been tested with diverse groups of children, however, few studies to date have examined how intervention effects vary across children and how children's behaviors during intervention sessions affect their ability to benefit from participation.

## Spillover Effects

As any teacher knows, how children behave in the classroom (or during an intervention session) affects not only that child's own ability to learn, but also the other children around them. We call this a "spillover effect." Research on inclusive classrooms (i.e., classrooms including children with special needs as well as children without special needs) shows that children can be a positive influence for one another by serving as peer models (Odom & Diamond, 1998). Positive spillover effects can be seen in non-inclusive classrooms too. For example, studies show that children's vocabulary relates to the vocabulary of their classmates (Mashburn, Justice, Downer, & Pianta, 2009). Spillover effects can also lead to increased negative behaviors. For example, findings from one study revealed that preschool children had more difficulties demonstrating self-regulation in groups than by themselves (McCabe & Brooks-Gunn, 2007). In this study, we were interested in looking at how children's behaviors impacted their own ability to benefit from a behavioral regulation intervention as well as how their behaviors (and specifically off-task behaviors) affected those around them.

## Improving Behavioral Regulation through Circle Time Games

In a recent paper (Tominey & McClelland, 2011), we shared results from the Kindergarten Readiness Study, a pilot intervention that used circle time games to help children practice behavioral regulation skills. Sixty-five children participated in the study; thirty-two children were randomly assigned to participate in playgroup games twice per week for eight weeks and thirty-three children were randomly assigned to the control group. The games were variations of traditional children's games (such as "Red Light, Green Light" and "Simon Says"). All of the games used music and movement and required children to pay attention, remember increasingly complicated rules, and start and stop to different cues. Results from the Kindergarten Readiness Study revealed that for children who started the year with low behavioral regulation skills, participating in the intervention playgroups led to significantly higher gains in behavioral regulation in comparison to a control group. We also found that children in the intervention group made greater gains in emergent literacy scores over the year than children in the control group even though the games had no literacy components (no emphasis on letters or reading of any kind).

## Intervention Participation and Head Start

The group of children participating in the intervention attended a school that included both children enrolled in Head Start (children from low-income families) as well as children from more economically-privileged families (who did not qualify for Head Start) in the same classrooms. Of the thirty-two children participating in the intervention playgroups, fourteen were enrolled in Head Start (44%). When we compared how much children's behavioral regulation scores increased over the year dividing children into groups based on Head Start enrollment status, an interesting finding emerged. We found that although children in both groups showed significant growth in behavioral regulation from participating in the intervention, children from low-income families (those enrolled in Head Start) did not benefit as much as children from more economically-privileged families.

This finding led to another research question: *Why did children from low-income backgrounds benefit less than their peers from participating in the intervention?* Over the year, we recorded field notes detailing each intervention session, including which games we used, how children responded to the games, children's behaviors during the intervention session, and challenges experienced by the playgroup leader. We reviewed the field notes for patterns that might help explain why some children showed greater gains than others. We started by looking for evidence of on- and off-task behaviors across all children individually.

## Off-Task Behaviors and Intervention Participation

In the field notes, we found evidence for two types of off-task behaviors: 1) behaviors unrelated to the activities and 2) off-task behaviors related to the activities. In general, off-task behaviors unrelated to the activities included answering questions with off-topic comments ("Tomorrow is Saturday and we don't come to school," and "What's in those [drawers]?"), climbing and standing on chairs at the edge of the room, stacking carpet squares, and crawling under tables.

Off-task behaviors related to the activities included trying to make the loudest noises, such as while playing instruments, or focusing on running during a game like Red Light, Green Light to “win” the game rather than following directions and tiptoeing.

### Initiators and Imitators

We categorized children who exhibited off-task behaviors as “imitators” or “initiators.” Seven of the 32 children in the study were “initiators,” in other words, these children were leaders in off-task behaviors. All of the initiators were also “imitators” and copied the off-task behaviors of others. In addition, we categorized nine children as “imitators.” These children did not initiate off-task behaviors themselves, but copied the off-task behaviors of the initiators. After coding off-task behaviors, we then looked to see if there were links between these behaviors and Head Start enrollment status. Of the children enrolled in Head Start who participated in the intervention playgroups, 78.5% were coded either as imitators or initiators in comparison to only 11% of the children not enrolled in Head Start. Six out of the seven initiators (86%) were enrolled in Head Start and six out of nine imitators (67%). These findings add to existing research suggesting that children from low-income backgrounds are more likely to struggle with self-regulation than their peers, may have more trouble paying attention, and spend more time participating in off-task behaviors (Evans & Rosenbaum, 2008; Wanless, McClelland, Tominey, & Acock, 2011).

### Spillover Effects

In addition to these findings, we found evidence of spillover effects within playgroup sessions. We found that the number of imitators was higher in playgroups that had more than one initiator. Only one group included an initiator with no imitators. Whether or not an initiator was imitated appeared to be related to the child’s peer relationships within the group. For example, one child who was coded as an initiator was never imitated. This child had few interactions (either positive or negative) with the other children in the group. She did not try to engage other children in her off-task behaviors and her behaviors appeared to bother other children. The other children appeared to be indifferent to this child and her actions. Another child was imitated by one or more children every time he exhibited an off-task behavior. This child was well-liked by the other children. He often said words or made faces that made other children laugh and would continue these behaviors as long as he was receiving positive attention from his peers (e.g., laughing or imitation). The majority of his off-task behaviors were active attempts to engage other children. This pattern was present throughout the field notes: children who demonstrated positive social interactions were most likely to be imitated and received positive attention from their peers when exhibiting off-task behaviors.

## IMPLICATIONS AND CONCLUSIONS

The findings from the Kindergarten Readiness Study have several implications. First: *Behavioral regulation can be improved with practice.* Music and movement circle time games that help

children practice paying attention, remembering sets of instructions, and starting and stopping to different cues, can be a fun and effective way to promote these skills. For a description of the games used in this study see (Tominey & McClelland, 2011). Second: *Children's behaviors in group time settings may affect their ability to participate in and benefit from behavioral regulation games.* Children from low-income backgrounds were more likely than their peers to initiate or imitate off-task behaviors. They also showed smaller gains in behavioral regulation over the year. And third: *Children's off-task behaviors may spill-over and affect other children's participation.* When playing games like these in a group, the behaviors of some children may affect not only their own ability to benefit from the games, but other children's as well. It may be important to play games such as these at different times of day with different groupings of children (during large group, in small groups, and individually) so that children have multiple exposures to practicing these skills in different contexts to maximize benefit.

In conclusion, findings from this study can be used to refine how we promote behavioral regulation for children. These results also have the potential to inform preschool curricula that include behavioral regulation games to ultimately improve academic achievement. The development of behavioral regulation interventions that can be easily implemented by teachers in classroom settings is critical to ensure that all children enter school with the skills they need to benefit from classroom learning activities.

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