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The effect of peers' self-regulation on preschooler's self-regulation and literacy growth

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ABSTRACT

Peer effects, or the effect of peer skill levels on an individual's skills, are important predictors of school achievement, with recent research suggesting that they are also predictive of preschool skills. This study investigates the effect of peer levels of self-regulation on two aspects of school readiness: self-regulation and early literacy; and whether peer effects differ based on individual child skills and sex. Peer effects were assessed for 629 preschool children in 56 classrooms. Utilizing multilevel models within a structural equation modeling framework, peer self-regulation predicted self-regulation and letter word decoding growth, but not letter word knowledge. This suggests that peers can play a role in children's individual learning. Additionally, girls demonstrated higher spring self-regulation than boys. Peer effects were more predictive of spring self-regulation for children with low, rather than high, levels of fall self-regulation. These findings highlight the importance of preschool social/interactional environments.

Children who attend quality preschool programs exhibit higher academic achievement, are more likely to attend college and graduate school, are less likely to drop out, and are less likely to be placed in special education classes (e.g., Barnett, 1993; Burchinal, 1999; California Department of Education, 2003; Rolnick & Grunewald, 2011; Slaby, Loucks, & Stelwagon, 2005). To maximize the efficaciousness of all preschool programs, both policymakers and researchers have worked to disentangle and understand the aspects of quality programs that contribute substantively to children's development and later success (e.g., Bowman, Donovan, & Burns, 2001; Hindman, Skibbe, Miller, & Zimmerman, 2010; Pianta, Cox, & Snow, 2007). The current study examines a critical component of school readiness, self-regulation (Blair, 2002; McClelland & Morrison, 2003; McClelland et al., 2007; McClelland, Acock, & Morrison, 2006), both for individuals in the preschool context as well as for peers within a classroom setting.

Individual self-regulation predicts early academic achievement and school success through college (Eisenberg & Spinrad, 2004; Howse, Calkins, Anastopoulos, Keane, & Shelton, 2003; McClelland et al., 2006; McClelland, Acock, Piccinin, Rhea, & Stallings, 2013). In addition, recent findings with grade school aged children indicate that students' academic achievement is influenced not only by their own level of self-regulation but also by their classroom peers' levels of self-regulation (Skibbe, Phillips, Day, Brophy-Herb, & Connor, 2012). Peer effects have long been a focus in research and policy involving grade school classrooms (Hanushek, Kain, Markman, & Rivkin, 2003; Hattie, 2002; Prinstein & Dodge, 2008; Zimmer, 2003). Yet only recently have researchers focused on preschool peer effects, despite the fact that findings could facilitate a better understanding of the mechanisms through which early complex skills are acquired, manifested, and related to other constructs of interest, which could help professionals to better structure early experiences to support these skills (e.g., De Haan, Elbers, Hoofs, & Leseman, 2012; Henry & Rickman, 2007; Justice, Petscher, Schatschneider, & Mashburn, 2011; Schechter & Bye, 2007). The current study adds to this new literature by investigating the effect of preschool peers' levels of self-regulation on two skills rated by teachers as important for later school readiness: an individual's self-regulation and early literacy skills (Rimm-Kaufman, Pianta, & Cox, 2000).

1. Defining self-regulation

The definition and conceptualization of self-regulation is frequently debated, in part, because of its relevance to many fields of study including developmental (effortful control; Aksan & Kochanska, 2004), educational (McClelland et al., 2007), and cognitive research traditions (executive function; Zelazo et al., 2003). That said, there is general consensus that self-regulation refers to a multiple component construct that broadly represents the volitional ability to respond to the environment in an adaptive manner (Aksan & Kochanska, 2004; Blair & Razza, 2007; Cameron Ponitz et al., 2008; Cole, Michel, & Teti, 1994).

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One environment that consistently requires self-regulation is that of the early classroom where children must modify their behavior in relation to their exposure to teachers, peers, rules, and routines (Phillips, McCartney, & Sussman, 2006). Self-regulation drives functional classroom behaviors such as attending to, remembering, and consistently carrying out classroom rules, routines, and teacher instructions despite distractions (Howse et al., 2003; McClelland et al., 2006; McClelland, Morrison, & Holmes, 2000; Rimm-Kaufman et al., 2002). In this study, we operationalize self-regulation as *behavioral self-regulation*, defined as the integration of cognitive skills such as attention, working memory, and inhibition into an adaptive, overt response (Cameron Ponitz et al., 2008). We focus on this conceptualization as it is consistently linked to the aforementioned classroom behaviors (Cameron Ponitz et al., 2008; McClelland et al., 2007; McClelland, Ponitz, Messersmith, & Tominey, 2010) and focuses on many aspects of self-regulation (although not all, see Gross & Thompson, 2007 for a discussion of important emotional aspects of self-regulation) needed to succeed in the classroom (Blair, 2002; Cameron Ponitz et al., 2008; McClelland et al., 2006). For example, recent work demonstrates that higher levels of self-regulation are linked to teacher reported social functioning, as well as observed classroom learning behaviors including higher participation in learning activities, social-learning interactions, and multi-step interactions, as well as fewer disruptive behaviors or disengagement. These, mostly social, classroom behaviors are related to greater academic gains (Montroy, Bowles, Skibbe, & Foster, 2014; Nesbitt, Farran, & Fuhs, 2015).

In addition to being a context where self-regulation is consistently needed, preschool also likely plays a functional role in the development and manifestation of self-regulation (Blair, 2002) and its emergent association with early academic achievement (Bronson, 2000; McClelland et al., 2007). Specifically, based on an ecological systems approach, skill acquisition and expression is best described by bidirectional exchanges between person and context, with preschool representing a unique context that both affects and is affected by who is in the preschool classroom (Bronfenbrenner & Morris, 2006; Kopp, 1982; Prinstein & Dodge, 2008; Hamre & Pianta, 2001). Put another way, preschool learning is expected to be highly socially mediated, whereby interactions with others is the probable mechanism through which complex skills are scaffolded and fostered on a day to day basis. A large body of research has demonstrated the importance of early child-teacher interactions and relationships (e.g., Birch & Ladd, 1998; Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002; Cadima, Doumen, Verschueren, & Buyse, 2015; Hamre & Pianta, 2001), but only recently has attention been given to how peers affect the acquisition and manifestation of school readiness skills (Eggum-Wilkens et al., 2014; Henry & Rickman, 2007; Mashburn, Justice, Downer, & Pianta, 2009; Justice et al., 2011). Many preschool activities revolve around group participation (i.e., large and small group exercises such as sounding out the first letter of a classroom peer's name, and guessing the name when the teacher assigns the child to a classroom job), or focus on rules and routines that draw children's attention both to their own and peers' behaviors (e.g., waiting until the classroom quiets down before reading a story). Consequentially, a better understanding of how preschool peers affect early learning opportunities is necessary for a more nuanced understanding of the effect of early childhood classrooms on children's development and outcomes.

2. Peer effects, self-regulation, and early literacy

Previous empirical studies clearly indicate that peer effects, often operationalized by aggregating children's individual characteristics at the classroom (mean) level, influence the manifestation of individual skills (Bulotsky-Shearer, Dominguez, & Bell, 2012; Domínguez, Vitiello, Fuccillo, Greenfield, & Bulotsky-Shearer, 2011, Henry & Rickman, 2007; Justice et al., 2011; Mashburn et al., 2009). For instance, peer levels of self-regulation predict first graders' literacy gains above and beyond the individual child's self-regulatory skills (Skibbe et al., 2012). Notably, the main effect of classroom peers' self-regulation was stable even in environments where self-regulation and literacy skills were expected to be lower such as high poverty schools. Likewise, preschool peer problem behaviors are associated with end of the year individual cognitive and social skills (Bulotsky-Shearer et al., 2012).

Given these findings, one could certainly anticipate that preschool peer levels of self-regulation affect individual skill development. Specifically, self-regulation modeled and reinforced by preschool peers may affect individual children's access to continued regulatory and academic learning. Theoretically, classrooms with several children who exhibit higher levels of self-regulation may bolster individual self-regulation as these highly skilled peers bring their skills to bear during free play by choosing games that require turn taking, following directions, and sustaining attention, thus, effectively scaffolding regulatory abilities (Vygotsky, 1977). During learning times (e.g., large group), attentive peers who follow directions and engage in learning activities also probably help others to behave similarly which could allow teachers to focus less on class management and more on early academic skills, such as early literacy (e.g., Henry et al., 2000; Ladd, 1990; Rimm-Kaufman, La Paro, Downer, & Pianta, 2005). In other words, when peers are able to sit, listen, and follow rules, individual children have more access to learning content. In contrast, classrooms with many children exhibiting lower self-regulation skills may perpetuate these lower skill levels through disruptions or outbursts that distract others and require teacher intervention. Likewise these classrooms may encourage more highly skilled children to disengage from learning, as the teacher's attention is consistently focused on others (Lavy, Paserman, & Schlosser, 2011). Either way, peers displaying low levels of self-regulation require teacher resources and intervention, leaving less time for cooperative play and learning. This likely disrupts children's acquisition of more adaptive, higher levels of self-regulation and early literacy skills.

Yet, the potential contributory role that classroom peers' levels of self-regulation may play in the differences between preschool classes in preparing children for formal school entry has remained largely untested. In the current study we focused on the associations between peer self-regulation and individual development of not only individual self-regulation skills, but also early literacy skills. We chose these skills in order to evaluate the role of peer self-regulation in relation to a proximal area of development for the individual child (self-regulation), as well as a more distal area of development (early literacy skills). The two main aspects of early literacy skills we tested were letter name knowledge and letter word decoding related skills as these skills in particular are strong indicators of future reading skills (National Early Literacy Panel, 2008), and previous research suggests that these skills are consistently focused upon within preschool classrooms (Connor, Morrison, & Slominski, 2006). Thus we would expect that classroom peer behavior is more likely to be associated with the acquisition of these skills.

In addition to findings that indicate the importance of classroom peers for early skills, mounting evidence also indicates that children may differentially react to peers based upon their own skill levels (De Haan et al., 2012; Hanushek et al., 2003; Justice et al., 2011; Schechter & Bye, 2007). Specifically, children with lower self-regulation could benefit from exposure to children who consistently model and reinforce higher levels of self-regulation. This may particularly be the case with self-regulation skills given that these skills increase greatly during preschool (e.g., Blair, 2002), are highly socially mediated (e.g., Bronson, 2000), and that, in older children, classroom peer levels of self-regulation were more predictive of literacy skills than the child's own self-regulation skills (Skibbe et al., 2012). Thus, within the current study, we assessed whether there is an interaction between individual children's self-regulation and peer self-regulation on growth in self-regulation and early literacy skills. We hypothesized that classroom peer levels of self-regulation differentially relate to individual skill growth based on the child's initial skill level; such a finding, if confirmed, would have strong policy implications for preschool education practices, specifically