

Understanding children's self-regulation within different classroom contexts

Kristy Timmons, Janette Pelletier and Carl Corter

Published in: Early Child Development and Care

Pre-Print

ABSTRACT:

In this study, children's self-regulation was observed, along with other social and academic activities in kindergarten classrooms during whole group, small group, transition and play contexts. We examined how children's self-regulation and engagement differed among classroom grouping, play and transition contexts. Results showed that students respond to opportunities for self-regulation significantly more often in small group and play contexts. Similarly, children demonstrate the highest engagement in play and small group contexts. Given that adults and other children comprise an important part of the environment for children's self-regulation, we also examined whether there were differences in the number of interactions children have with other children and educators across academic, social and play activities, and how these interactions broke down by classroom context. Findings have practical implications for educators working in early years settings; classroom grouping, play and transition contexts set the scene for children's engagement and opportunities to self-regulate.

Introduction

This study examined how play-based, full day Kindergarten programs contribute to children's classroom experiences- in particular, children's opportunities to self-regulate. We observed children's self-regulation behavior in social, academic and play activities during whole group, small group, transition, and play contexts in the classroom. The importance of play and self-regulation are discussed in research and policy documents worldwide (Bodrova & Leong, 2007; Cannon, Jackowitz, & Painter, 2011; FDELK, 2010; Miller & Almon, 2009) however, effective implementation of these curricula means understanding how these documents are translated into the everyday classroom experiences of children. This paper describes such experiences for children who were enrolled in Full Day Early Learning Kindergarten (FDELK) classrooms located in the western part of a Greater Metropolitan Area in Ontario, Canada. The results from the study have important implications for theoretical understanding of the mechanisms through which children learn to develop necessary self-regulation skills in kindergarten. Results should inform reflection and ongoing improvement of practice and policy initiatives directly related to play-based learning in early learning environments.

Self-Regulation Skills and Kindergarten

Self-regulation has been a research focus in many fields ranging from education, to neurobiology, to many subfields of psychology. Although there is not a universal definition, self-regulation is commonly understood as the ability to control emotional states, cognitive processes, and behavior when faced with external pressures or impulses in order to accomplish a desired state or goal (Bauer & Baumeister, 2011; Buckner, Mezzacappa, & Beardslee, 2009; Diamond & Lee, 2011). Thus, self-regulation may be understood as a construct that operates to manage an individual's ability to control her/his thoughts, emotions, and behaviors. Self-regulation

capacities differ from reactive responses in that self-regulation allows the individual to have control over his/her thoughts and feelings in a purposeful way (Bauer & Baumeister, 2011; Eisenberg, Smith, & Spinrad, 2011).

Self-regulation develops across the lifespan, but there is evidence suggesting that the first five years of life are particularly important for self-regulation development (Calkins, 2007; McCain, Mustard, & McCuaig, 2011). Although a wealth of self-regulation research focuses on the interactions between primary caregivers and the infant child (Bernier, Carlson, & Whipple 2010; Karreman, van Tuijil, van Aken, & Dekovic, 2006; Keller et al., 2004; Thompson & Goodvin, 2007), over the past few years research has emerged on the role of early learning environments such as childcare, preschool and kindergarten programs, in children's self-regulation development (Pascal, 2009; Ponitz, McClelland, Matthews, & Morrison, 2009; Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009).

Entry into kindergarten is a time when children experience challenges to their social, emotional, cognitive, and behavioral capacities (Bronson, 2000). These demands engage self-regulation skills and may contribute to their further development in successful transitions into the kindergarten environment (Rimm-Kauffman & Pianta, 2000). Children's early self-regulatory and attention skills are among the strongest predictors of future academic success (Duncan et al., 2007). Attention ability is an area of self-regulation that is particularly prominent in the literature on children's transition to and experiences in kindergarten (Brigman & Webb, 2003; Dice & Schwanenflufel, 2012; Fitzpatrick & Pagani, 2013; Kegel & Bus, 2013). Attention abilities, also referred to as attention control skills, play a strong role in supporting children's ability to focus on relevant learning activities, while inhibiting distracting stimuli (Rhoades, Greenberg, &

Domitrovich, 2009; Saez, Folsom, Otaiba, & Schatschneider, 2012) and following the instructions of teachers (Pagani, Fitzpatrick, Archambault, & Janosz, 2010).

Self-regulatory skills in kindergarten are also predictive of academic competencies such as literacy and math skills (Dice & Schwanenflugel, 2012; Howse et al., 2003; Kegel & Bus, 2013; Ponitz, McClelland, Mathews, & Morrison, 2009; Saez et al., 2012). Dice and Schwanenflugel (2012) for example, reported that children's attention control skills are related to emergent literacy, including markers such as decoding skills. Furthermore, Ponitz and colleagues (2009) revealed that teacher ratings of regulation are positively related to better task performance and better academic scores in literacy and mathematics.

Based on the emerging literature on the important role of self-regulation development in kindergarten environments, professionals have made great efforts to align early learning programs with research and best practices in early learning and care. More specifically, program and policy recommendations include ways to improve self-regulation skills for young children through play-based learning opportunities in early learning and kindergarten environments (McCain et al., 2011; Pascal, 2009; Pelletier & Corter, 2005). In Ontario, where the current research was completed, a new play-based full-day early learning kindergarten program was introduced in September 2010 in a time and context in which a growing body of evidence points to the importance of play and self-regulation in promoting healthy child development (e.g., Bodrova & Leong, 2008; Durlak, Weissberg, Dymnicki, Taylor, & Schelinger, 2011; Moffitt et al., 2010).

Role of Play and Interactions on Self-Regulation Development

When children engage in play episodes, they practice and develop skills that are fundamental to self-regulation (Hawes, Gibson, Mir, & Pelletier, 2012). Play offers children the opportunity to engage in flexible thinking, goal-directed behavior, and in negotiation and

cooperation with peers, while focusing their attention on a particular task, all of which are fundamental to the development of self-regulation (Baumeister & Vohs, 2011). Sylva and colleagues' (2010) large-scale study suggested that program quality, including the opportunity for play, is predictive of self-regulation in children who were followed to 11 years of age. Understanding the contribution of play in the development of children's self-regulation is important given that early learning programs worldwide are moving to a focus on play-based learning (Bodrova & Leong, 2005; DEEWR, 2009; EYLF, 2010; FDELK, 2010; Lester & Russell, 2008; SACSA, 2009; Siraj-Blatchford, 2008; Steglin, 2005).

The FDELK curriculum suggests that play-based environments provide the best context for fostering self-regulation skills in young children (FDELK, 2010). This stance is also held by researchers who have studied the ways in which play fosters self-regulation development in children (Berk, Mann, & Ogan, 2006; Elias & Berk, 2002; Robson, 2010; Qu, 2010). In thinking about play and self-regulation, it is important to note that there is controversy over what play-based learning looks like, specifically regarding the type of structuring provided by adults. At one end of the spectrum there are those who understand play-based learning to mean providing children opportunities to engage in "free play" or "unstructured play" episodes with "emergent" learning themes, while at the other end, there are those who interpret play-based learning to mean providing opportunities in which educators structure children's play or provide leaning materials that are concrete and engaging (Bruce, 2001; Siraj-Blatchford, 2009; Thomas, Warren, & deVries, 2011; Wood, 2009). Therefore, it is important to explore the types and frequencies of interactions in play-based kindergarten classrooms to understand how these interactions contribute to children's learning and self-regulation in these environments.

Research on play and self-regulation is dominated by studies looking at children's socio-dramatic play. For example, in Elias and Berk's (2002) study findings revealed that children's participation in socio-dramatic play was predictive of their ability to regulate their behaviors in different classroom contexts including transition times such as clean-up. Socio-dramatic play allows children to interact with one another in ways that require a negotiation of roles; in order to ensure a successful play episode, children must override their personal impulses (Bodrova & Leong, 2008). When children negotiate roles within socio-dramatic play, they share common play goals. Children who share play goals demonstrate higher levels of self-regulated behavior, more specifically focused attention (Qu, 2010). When children interact with others, they internalize the requests of their playmates and this process is important not only for helping children engage in social relationships, but also in developing their capacity to comply with rules in a self-directed way (Kochanska, Coy, & Murray, 2001). Although several studies have pointed to the benefits of socio-dramatic play for self-regulation development, it is important to acknowledge that this research has also been criticized for methodological issues and a lack of replication (Lillard et al., 2013). Others argue that other forms of play, such as solitary play (child playing alone, not interacting with others) and parallel play (child playing in close proximity to another child or children, either with the same or different materials), are important for development in early learning environments (Rubin, Coplan, Fox, & Calkins, 1995). In addition to understanding how various forms of play contribute to self-regulation development, it is also important to understand how child-child interactions contribute to children's development in early learning contexts.

Children who have positive interactions with peers in classroom contexts and who engage in interactions that involve acceptance, sharing and play, are more likely to be successful in

school (Downer & Pianta, 2006; Williford, Whittaker, Vitiello, & Downer, 2013). Research in the area of early peer interactions and self-regulation focuses on the important role of play. In 1978, Vygotsky theorized that play was particularly important in the development of children's self-regulation, as play provides the opportunity to practice regulating one's own emotions and behaviors and those of peers involved in play as well. To date, research has supported Vygotsky's claims regarding the importance of play in developing children's self-regulation (e.g., Elias & Berk, 2002; Fantuzzo, Sekino, & Cohen, 2004). Thus, when understanding how peer-interactions contribute to children's self-regulation it is crucial to take play episodes into account.

Self-regulatory skills allow students to build relationships with others, which in turn supports their learning within the classroom setting (Merritt, Wanless, Rimm-Kaufman, Cameron, & Peugh, 2012). Because children begin schooling with significant differences in their social and behavioral skills (Rimm-Kaufman, Pianta, & Cox, 2000), it is important to understand the unique contribution of teachers in fostering children's social and self-regulation once they begin formal schooling.

The quality of teacher-child interaction is particularly important for children's self-regulation development (Pianta & Stuhlman, 2004). Merritt and colleagues (2012) define emotionally supportive teachers as those who are sensitive to the social and emotional needs of all students and are thoughtful about the ways in which they interact and respond to children. Teachers who are emotionally supportive encourage students to have positive interactions with their peers, demonstrate their understanding of students' interests, while creating opportunities that allow children to share their viewpoints (Pianta, LaParo, & Hamre, 2008). Previous research has demonstrated the connection between teachers' emotional support and children's self-

regulation abilities (e.g., Mashburn et al., 2008; Perry, Donohue, & Weinstein, 2007). Teacher-child closeness, as measured by teacher reports, is related to student self-regulation outcomes; more teacher-child closeness in kindergarten is related to a decrease in externalizing behaviors over time (Silver, Measelle, Armstrong, & Essex, 2005). Although a wealth of literature points to the important role of educator and child relationships in fostering positive self-regulation skills in kindergarten, research is needed that provides information on the impact of the nature and quantity of these relationships on self-regulation development.

To build on the emerging literature on children's early self-regulation we examined how children's self-regulation and engagement differed among 4 classroom contexts: whole group, small group, transition, and play. Furthermore, we sought to understand whether there were differences in the number of interactions children have with other children and educators across academic, social and play activities, and how these interactions broke down in terms of classroom contexts. The self-regulation tool used to capture this information, the Child Observation Framework (COF), is in keeping with Baumeister's and Vohs (2011) model, specifically, in the belief that self-regulation behaviors vary among contexts (e.g., free play versus transition time).

In keeping with the definitions of self-regulation presented in the literature aligned with the purpose of the paper, a practice-oriented approach to self-regulation was adopted. The practice-oriented approach can be compared to stricter research and theory-based approaches such as those that focus on core cognitive executive functions. In this paper, we consider a practice-oriented view of self-regulation, which was generated from an examination of policy documents. Details regarding the development of the tool are beyond the scope of the paper and described elsewhere (Hawes et al., 2012). Based on this view, self-regulation is defined as, "the

ability to adapt one's emotions, behaviors and attention to meet the demands of a given situation; it involves taking into account not only one's own thoughts and feelings, but those of others as well" (Hawes et al., 2012, p. 34). This view differs from the cognitive-only view of self-regulation in that it acknowledges the importance of learning contexts and interaction between and among children and other educators.

Methods

Setting and Participants

Participants included 40 children, 16 females and 24 males, enrolled in junior or senior full-day early learning kindergarten (4- and 5- year olds) in the western part of the Greater Toronto Area in Canada. Child participants are part of an ongoing longitudinal research project examining the implementation and impact of full-day early learning kindergarten over four years (e.g. Pelletier, 2014a, 2014b). Using the participant list for the full-day kindergarten sites, we randomly selected 40 children from nine sites. Child participants represented the ethno-linguistic diversity of the region in which the schools were located. More than 60% of children spoke a language other than English at home. Predominant language groups for the FDK sites included Punjabi, Urdu, Tamil and Cantonese. Child participants were fluent enough in English to participate in the research and had parents who were able to complete consent forms and surveys.

In the classrooms in which the research took place, two educators work together to implement the full-day kindergarten program. The educators include one teacher and one early childhood educator (ECE) who work as a team to support the development of the children

throughout the regular school day. Therefore, when observations were completed, either of the educators may have been included.

Procedures

The data collection was carried out in nine full-day kindergarten classes from April to May of 2013. Procedures involved direct observations in four classroom contexts: whole group instruction (WG), small group instruction (SG), transition time, and play. Researchers completed continuous running records for 10-minute periods while children were engaged in each of the four contexts for a total of 40 minutes per child. Prior to starting the observations the researchers spoke with the classroom teachers about the daily schedule to ensure that each child was observed in each classroom context. While at the school the researchers employed a protocol with documentation that included 4 running record forms for each 10 minute context observation, 4 “engagement” forms to rate children’s level of engagement during each context, and one summary narrative form. The engagement forms allowed the researchers to rate each child’s engagement score as not engaged, somewhat engaged, or very engaged in each context.

After completing the observations at the school, researchers were responsible for coding the running records within a 24-hour period using the Child Observation Framework (COF). The researchers used each running record as the primary source of information. All researchers were trained prior to the observations on procedures for completing the running records and how to code them using the COF; training took place over 4 group sessions. During these training sessions samples of running records were provided and researchers practiced by first coding individually, then by comparing their codes with the other researchers. This procedure continued until reliability was reached (reliability procedures further explained on page 13).

Measures and Scoring

Self-Regulation. The self-regulation items that appear in the COF (Corter et al., 2009; Hawes et al., 2012) reflect aspects of Baumeister & Vohs (2011) models including the belief that self-regulation behaviors vary across contexts, in this case, WG, SG, transition, and play. WG, SG, and play contexts were selected as they are acknowledged for being the primary contexts of learning in kindergarten environments (Gullo, 2006; FDELK, 2010). The transition context was added as another regular form of activity that presents demands and opportunities for self-regulation. The COF includes 17 items categorized under three broad domains: emotional, social/language, and cognitive (see Appendix A). Researchers used the running record from each context to complete the self-regulation coding sheet. Using the self-regulation coding sheets the researchers evaluated each of the 17 items separately, scoring the child's behavior as a *yes*, *no*, or *n/a* for each item. A *yes* indicated a child's ability to successfully self regulate, a *no* indicated an unsuccessful ability to self regulate, and a *n/a* indicated that no opportunities were seen therefore, the researcher was not able to indicate whether the child demonstrated successful or unsuccessful self-regulation skills for that item. From these codes, we calculated the percentage of opportunities to self-regulate in which the children responded positively within each context (WG, SG, transition, and play). In order to obtain this score the *yes* and *no* scores were added together and the *yes* score was then divided by the total, giving a percentage of *yes* to overall opportunities to self-regulate.

Engagement. In addition to the coding of various kinds of opportunities for self-regulation, researchers rated each child's overall engagement with activities during each observation block of WG, SG transition time, and play. Rating employed a three-point scale (0= not engaged (distracted, unable to concentrate, inattentive/no participation in normative activity), 1=

somewhat engaged, and 2=very engaged (listens attentively/ eager participation in task/activity)). The researchers assigned each child a score immediately following the observations.

Child-Child Interactions. The child-child interaction observation form allowed the researchers to code each running record by type of interaction with a peer or peers. There were 13 items that fell under 3 types of interactions: academic, social, and play (see Appendix B). Academic interactions included activities such as numbers and patterning, language and literacy, science and technology and art. Social interactions included activities such as conversations, direct/verbal correction, physical/gross-motor, praise/physical or verbal affection/ and negative peer activities such as aggression. Play interactions included activities such as dramatic, cooperative, associative/parallel, and solitary play (Dietze & Kashin, 2012). Researchers coded the frequency of each of the 13 items. Naturally there was overlap between coding of these activities and coding of opportunities for self-regulation as described above; for example, different forms of social play could offer various opportunities for the social regulation items.

In order to describe child-child interactions, the total scores for the 13 items for each context were calculated, providing frequency scores for each of the 13 items. Item analyses were then carried out. Next, the individual scores within each domain: academic, social, and play, were totaled for each context. Therefore, a total score for academic, social, and play was calculated for each context (WG, SG, transition and play). In addition to these context scores, 3 additional variables were computed, collapsing the 4 contexts together to understand the overall academic, social, and play scores. Therefore, child-child interaction scores provided contextual data by demonstrating the frequency of child-child interactions within the four classroom contexts (WG, SG, transition and play) and within the three domains: academic, social, and play.

Child-Educator Interactions. As with child-child interaction, researchers used the running records to code child-educator interactions for the target child. Interactions were coded for 13 items that fell under 2 types of interactions: academic and social (see Appendix C). The academic interactions included activities related to numbers and patterning, language and literacy, science and technology, art, direct instruction, and questioning. The social dimensions of interactions included types of activities related to: conversation, play extension, play participation, physical/gross motor, praise/affection, self-management prompt, and correction/direct-management. The researcher coded the frequency of each of the 13 items. Next, the individual scores within the 2 domains: academic and social, were totaled for each context. A total score for academic and social was provided for each context (WG, SG, transition and play). In addition to these context scores, 2 additional variables were computed, collapsing the 4 contexts together to understand the overall academic and social scores.

Reliability. A second coder used the running records to code 20 of the 40 observations to ensure reliability. Inter-rater reliability of over 90% was obtained for the self-regulation, engagement, child-child interactions, and child-educator interactions scoring. For all measures reliability was calculated by comparing agreements divided by agreements and disagreements. Self-regulation reliability was calculated by comparing agreements and disagreements for each item. Engagement reliability was scored for each running record. Child-child and child-educator interactions were calculated through a comparison of frequency scores for each item.

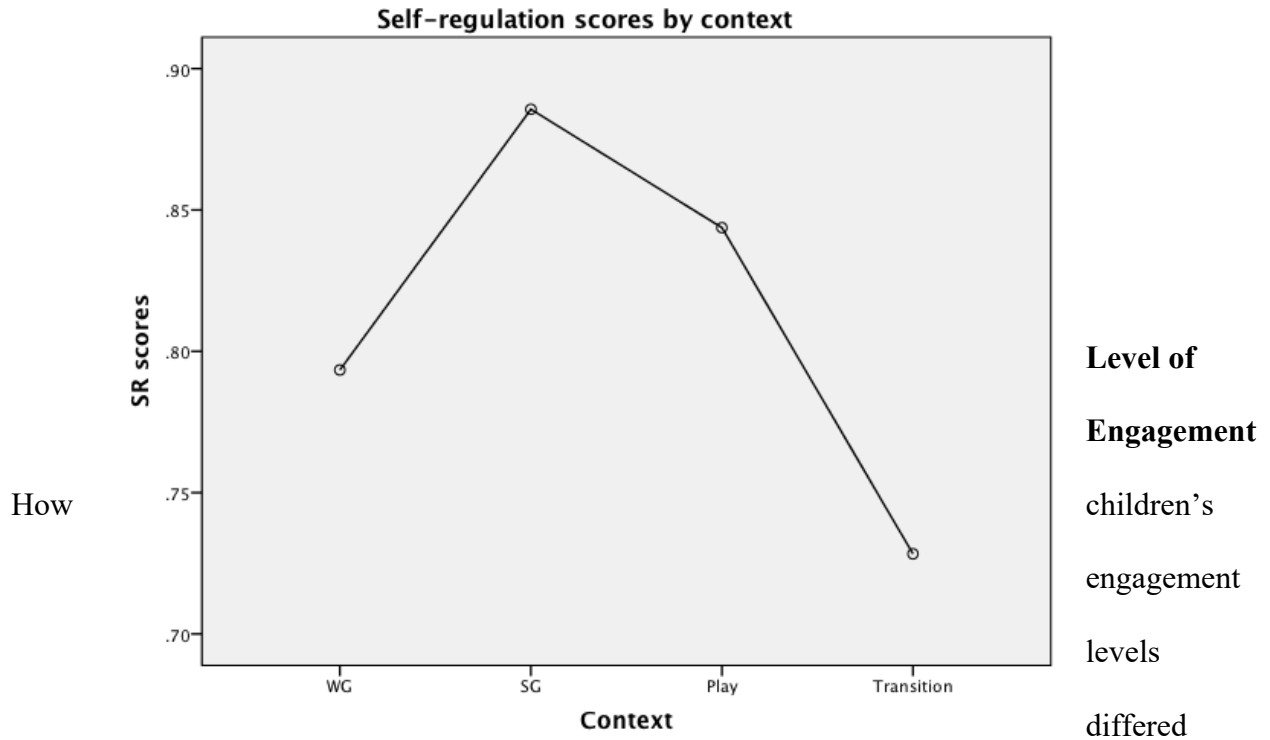
Results

How children's responses to opportunities for self-regulation differed among contexts

(WG, SG, transition, play).

A one-way within subjects ANOVA was conducted to examine the association between the four classroom contexts (WG, SG, transition, and play) and children's self-regulation, specifically, the percentage of opportunities to self regulate in which the children responded successfully within that context. The results suggest that the classroom contexts had an effect on children's success in self-regulation, Wilk's $\Lambda = .014$, $F(3,37) = 4.03$, $p = .01$, $\eta^2 = .25$.

Follow-up paired-samples t-tests were conducted to identify which contexts were significantly different. The results showed that children's SG self-regulation success scores were significantly higher than the WG scores (89% and 79% respectively; $t(39) = -2.05$, $p = 0.04$), and transition scores (73%; $t(39) = 3.50$, $p < .001$). Furthermore, play self-regulation scores (84%) were significantly higher than transition scores ($t(39) = 2.28$, $p = .02$). The results suggest that kindergarten students were more successful in responding to opportunities to self-regulate in SG and play contexts.



in the four contexts (WG, SG, transition and play).

A Friedman test was conducted to evaluate the significance of differences in medians among engagement scores for the four contexts: WG (median= 2.28), SG (median= 2.75), transition (median= 2.19), and play (median= 2.79). Differences were significant ($X^2(3, 40) = 15.31, p = .002$), and the Kendall coefficient of concordance was .13 indicating moderate differences among the four contexts.

Follow-up pair-wise comparisons were conducted using Wilcoxon tests to identify which contexts were significantly different. The median engagement scores in SG (2.75) contexts were significantly higher than in WG (2.28), $p = .005$, and transition contexts (2.19), $p = .005$. Engagement scores in play (2.79) contexts were significantly higher compared with WG (2.28), $p = .009$ and transition contexts (2.19), $p = .004$. There were no significant differences between engagement scores in WG and transition, or between play and SG settings indicating that children have significantly higher engagement scores in both play and SG contexts.

Child-Child Interactions

We asked whether there was a difference in the number of interactions children have with other children across academic, social, and play activities and how these patterns might differ in terms of WG, SG, transition and play observation contexts.

A one-way within subjects ANOVA was conducted with the factor being type of interaction (academic, social, and play), and the dependent variable being the child-child interaction scores. The results of the ANOVA indicated a significant difference, Wilk's $\Lambda = .30$, $F(2,38) = 44.47$, $p < .001$, $\eta^2 = .70$ indicating a strong effect. Pairwise comparisons were used to identify which interactions were significantly different. The results showed that the frequency of children's social interactions with peers was significantly greater than the frequency of both academic, $p < .001$, and play activities, $p < .001$. Furthermore, the frequency of children's play interactions with peers was significantly greater than in academic interactions, $p < .001$.

Child-child interactions within contexts.

A series of one-way within subjects ANOVAs was conducted to understand child-child interactions scores within each context.

Whole group.

To examine child-child interaction scores within the WG context an ANOVA was conducted. Results indicated a significant difference, Wilk's $\Lambda = .53$, $F(2,38) = 16.80$, $p < .001$, $\eta^2 = .47$. Pairwise comparisons identified which interactions were significantly different. The results of the pairwise comparisons showed that children interacted significantly more with other children during social interactions (mean=3.02) than during academic interactions (mean= .24, p

< .001) and play interactions (mean= .21, $p < .001$). However, interestingly there were no significant differences between academic and play interactions.

Small group.

As in the WG context, children had significantly more social child-child interactions (mean= 2.2) than academic (mean= .57), according to the ANOVA [Wilk's $\Lambda = .57$, $F(2,38)= 14.44$, $p < .001$, $\eta^2 = .43$ $p = .001$, and play (mean= .95), $p = .001$]. There were no significant differences between academic and play interactions.

Transition.

Similar to both WG and SG contexts, children had significantly more social interactions (mean= 4.9) than academic, (mean= .26, $p = < .001$) and play interactions (mean= .85, $p = .001$), according to the ANOVA [Wilk's $\Lambda = .39$, $F(2,38)= 30.27$, $p < .001$]. Furthermore children had significantly more play interactions than academic, $p = .03$ during transition times.

Play.

In keeping with the findings from the other contexts, children had significantly more social interactions (mean= 8.5) compared with academic (mean= .9, $p < .001$), and play interactions (mean= 6, $p = .001$), during play contexts as indicated by the results of the ANOVA, [Wilk's $\Lambda = .33$, $F(2,38)= 38.64$, $p < .001$.] Furthermore, children had significantly more play interactions than academic, $p < .001$ interactions with children.

Child- Educator Interactions

We asked whether there was a difference in the number of interactions children had with educators in academic versus social interactions and how these interactions broke down in terms of WG, SG, transition and play observation blocks.

A one-way within subjects ANOVA was conducted with the factor being type of interaction (academic or social), and the dependent variable being the child- educator interaction score. The results of the ANOVA indicated no significant differences between the number of child educator interactions in social versus. academic contexts.

Child-educator interactions within contexts.

A series of one-way within subjects ANOVAs was conducted to understand child-educator interactions scores within each context.

Whole group.

The results of the ANOVA indicated no significant differences in the frequency of child-educator interactions during social or academic activities in WG contexts.

Small group.

In SG contexts, educators had significantly more academic (mean= 8.2) than social interactions (mean= 5.2) with children as indicated by the results of the ANOVA [Wilk's $\Lambda = .69, F(2,38)= 17.16, p < .001$].

Transition.

Educators had significantly more social interactions (mean=4.8) than academic interactions (mean= 1.1) during transition time as indicated by the results of the ANOVA [Wilk's $\Lambda = .44, F(2,38)= 49.26, p < .001$].

Play.

Educators had significantly more social interactions (mean= 2.4) than academic interactions (mean= .43) during play contexts, as indicated by the results of the ANOVA [Wilk’s $\Lambda = .66, F(2,38), = 19.83, p < .001$].

Summary of Findings

Contexts	Self-regulation scores (percentage)	Engagement scores (median)	Child-child interaction scores (mean)			Child-educator interaction scores (mean)	
			Social interactions	Academic interactions	Play interactions	Social interactions	Academic interactions
WG	79%	2.28	3.02* ₂	.24	.21	4.6	5.4
SG	89%* ₁	*2.75	2.2* ₂	.57	.95* ₃	5.2	*8.2
Transition	73%	2.19	4.9* ₂	.26	.85	*4.8	1.1
Play	84%* ₁	*2.79	8.5* ₂	.9	6	*2.4	.43

*₁ Significantly more than WG and Transition
 *₂ Significantly more than academic and play interactions
 *₃ Significantly more than academic interactions

Discussion/Conclusion

The results of the self-regulation analysis reveal that kindergarten students responded to opportunities towards self-regulation significantly more often in SG and play contexts. Children’s self-regulation scores were highest in SG contexts, followed by play then WG, with children demonstrating the lowest self-regulation during transitions. Engagement scores followed a similar pattern; however, children demonstrated the highest engagement scores in play, followed by SG, WG, and transition times. Self-regulation and engagement scores are overlapping constructs with different measurement approaches. The advantage of the SR measure is that it is comprised of concrete situations and behaviors that educators can see and support to build self-regulation development. Engagement, in comparison, is more of a global judgment, which may have value as an indicator that educators should look further when a child is not engaged or a learning context is not engaging. Looking further may then entail building the

concrete opportunities and behaviors comprising the COF measure of SR. Therefore the self-regulation scores add value as a way of unpacking the kinds of interactions that can build global engagement. These findings demonstrate the similarities between engagement and self-regulation and also reveal how children responded differently to opportunities to self-regulate depending on the context in which they were engaged in. This is aligned with Baumeister's and Vohs' (2011) suggestion that self-regulation behaviors vary among contexts. More specifically, that one behavior is influenced by the characteristics of the particular context or environment.

Furthermore, different contexts provide distinctive cues regarding the types of interactions that are permitted and welcomed (Baumeister's & Vohs, 2011). This information is particularly useful for kindergarten teachers and early childhood educators, as they may want to reevaluate the ways in which they are facilitating WG time. Given the lower levels of engagement in WG instruction, educators can look for ways to better engage students, possibly by reducing the time spent on more mechanical aspects such as taking attendance and may want to consider employing more SG activities when providing instruction. In examining child-child interactions during SG contexts, children had significantly more social interactions with children than both play and academic interactions. In keeping with this finding, during child-educator interactions, children had significantly more social interactions than academic interactions with educators. Therefore, in addition to employing more SG activities in kindergarten environments, educators may want to consider the frequency of various types of interactions that children are having during these SG exchanges.

We examined children's interactions with other children during social, academic, and play interactions. When the 4 contexts were collapsed, findings demonstrated that children interacted significantly more often with other children in social activities compared with both

academic and play. In thinking about this finding, it is important to point out that play includes solitary play, in which many children are deeply engaged but are not interacting with others. Therefore, it is likely that the frequency of activities would be different in examining children's solitary behaviors. Children interacted significantly more often in play activities than in academic activities. Following this analysis each context was analyzed separately to understand how interactions break down in terms of WG, SG, transition, and play observation blocks.

Findings demonstrated that in WG and SG contexts children interacted significantly more with other children during social interactions when compared with academic or play interactions. There were no significant differences between academic and play interactions, demonstrating that social interactions dominate both WG and SG child-child interactions. Similarly, in both play and transition interactions, children had significantly more social interactions compared with academic and play interactions, while having significantly more play interactions than academic, demonstrating that in all four contexts social interactions occurred most often, followed by play. Interestingly academic interactions were seen least often in all child-child interactions. A possible explanation for these findings is that kindergarten teachers are organizing academic learning so that it is more social than solitary. These findings add to the literature on the ways in which peer interactions may contribute to children's learning (Berk, Mann & Ogan, 2006; Elias & Berk, 2002; Robson, 2010; Qu, 2010) in that that children's interactions in kindergarten settings are predominately social in nature. Educators can use this information in making decisions to better support children's learning in various contexts.

Understanding the types of child-child interactions in which children naturally engage most often, is information that can be utilized by teachers when planning group activities and setting up the classroom environment to support these peer interactions. This information is

important for educators and policy makers as they try to understand the types of interactions that children seek out and engage in during classroom contexts.

When examining child-educator interactions with all contexts collapsed there were no significant differences between the number of child-educator interactions in social or academic activities. Next, each context was examined separately and similar to the latter finding there were no significant differences between the number of child-educator interactions in social or academic contexts during WG. In SG contexts, however, educators had significantly more academic interactions than social interactions. This is an important finding, given that this is the only time in which academic interactions occurred more frequently than social interactions. Contrary to this, during play and transition contexts, educators had significantly more social interactions than academic interactions, demonstrating that the type of interactions educators have with students differs among classroom contexts. This is important given that most kindergarten classrooms have a variety of contexts for which they plan lessons. Educators can utilize this information when planning lessons in various contexts.

As noted this study is limited in its small sample size relative to the fine-grained observations and analyses we have conducted. While the findings on classroom contexts affecting opportunities for self-regulation are robust, other findings should be seen as suggestive and as the basis for further empirical work. We believe that further research is needed to understand: (1) how children's interactions with peers and educators influence the types of activities children engage in, and (2) how different classroom contexts contribute to children's self-regulation and engagement. Future research should focus more closely on what might be contributing to the differences in children's self-regulation and engagement scores and the different interactions children have with peers and educators.

In summary, the findings from this study have practical implications for teachers and early educators working in kindergarten programs and for their understanding of opportunities for learning and development that these environments afford. In particular the study shows how opportunities for self-regulation and during social, play, and academic interactions vary during the classroom contexts of WG, SG, transition and play times during the day.

References

- Australia Government Department of Education Employment and Workplace Relations for the Council of Australian Government (DEEWR). (2009). *Belonging, Being and Becoming: The Early Years Learning Framework (EYLF) for Australia*.
- Bauer, I., & Baumeister, R. (2011). Self-regulatory strength. In K. Vohs & R. Baumeister (Eds.), *Handbook of self-regulation* (2nd ed.) (pp. 64–82). New York, NY: The Guilford Press.
- Baumeister, R. F., & Vohs, K. D. (2011). *Handbook of self-regulation: Research, theory, and applications* (2nd ed.). New York: Guilford Press.
- Berk, L., Mann, T., & Ogan, A. (2006). Make-believe play: Wellspring for development of selfregulation. In D. Singer, R. Golinkoff, & K. Hirsh-Pasek (Eds.), *Play = learning: How play motivates and enhances children's cognitive and social-emotional growth* (pp. 74–100). New York, NY: Oxford University Press.
- Bernier, A., Carlson, S., & Whipple, N. (2010). From external regulation to self-regulation: Early parenting precursors of young children's executive functioning. *Child Development*, 81(1), 326–339.
- Bodrova, E., & Leong, D. (2008). Developing self-regulation in kindergarten: Can we keep all the crickets in the basket? *Young Children*, 63(2), 56–58.
- Bodrova, E., & Leong, D. J. (2005). Uniquely preschool: What research tells us about the ways young children learn. *Educational Leadership*, 63(1), 44–47.
- Bodrova, E., & Leong, D. J. (2007). *Tools of the mind: The Vygotskian approach to early childhood education*. Upper Saddle River, NJ: Pearson Education.
- Brigman, G., & Webb, L. (2003). *Ready to learn: Teaching kindergarten students school success*

skills. *The Journal of Educational Research*, 96(5), 286–292.

Bronson, M. (2000). *Self-regulation in early childhood*. New York, NY: The Guilford Press.

Bruce, T. (2011). *Learning through play: For babies, toddlers and young children* (2nd ed.). London: Hodder Education.

Buckner, J. C., Mezzacappa, E., & Beardslee, W. R. (2009). Self-regulation and its relations to adaptive functioning in low income youths. *The American Journal of Orthopsychiatry*, 79(1), 19–30.

Calkins, S. (2007). The emergence of self-regulation: Biological and behavioral control mechanisms supporting toddler competencies. In C. Brownell & C. Kopp (Eds.), *Socioemotional development in the toddler years* (pp. 365–384). New York, NY: The Guilford Press.

Cannon, J. S., Jackowitz, A., & Painter, G. (2011). The effect of attending full-day kindergarten on English learner students. *Journal of Policy Analysis and Management*, 30(2), 287–309.

Corter, C., Pelletier, J., Janmohamed, Z., Bertrand, J., Arimura, T., Patel, S.,...Brown, D. (2009). Toronto first duty phase 2, 2006–2008: Final research report. Retrieved from http://www.toronto.ca/firstduty/TFD_phase2_final.pdf

Diamond, A., & Lee, K. (2011). Interventions shown to aid executive function development in children 4 to 12 years old. *Science*, 333, 959–964.

Dice, J., & Schwanenflugel, P. (2012). A structural model of the effects of preschool attention on kindergarten literacy. *Reading and Writing*, 25(9), 2205–2222.

Dietze, B., & Kashin, D. (2012). *Playing and learning in early childhood education*. Toronto: Pearson Canada.

Downer, J. T., & Pianta, R. C. (2006). Academic and cognitive functioning in first grade: Associations with earlier home and child care predictors and with concurrent home and classroom experiences. *School Psychology Review*, 35(1), 11–30.

Duncan, G., Claessens, A., Huston, A., Pagani, L., Engel, M., Sexton, H.,...Duckworth, K. (2007). School readiness and later achievement. *Developmental Psychology*, 43(6), 1428–1446.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schelinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of schoolbased universal interventions. *Child Development*, 82(1), 405–432.

Early learning for every child today: A framework for Ontario early childhood settings (ELECT). (2007). (Rev. Jan, 2007. ed.). Toronto, ON: Ministry of Children and Youth Services. Early Years Learning Framework (EYLF): Professional Learning Program. (2010). Talking about 'play.' Retrieved from http://www.earlychildhoodaustralia.org.au/nqslp/wpcontent/uploads/2012/05/EYLFPLP_E-Newsletter_No1.pdf

Eisenberg, N., Smith, C., & Spinrad, T. (2011). Effortful control: Relations with emotion regulation, adjustment, and socialization in childhood. In K. Vohs & Roy Baumeister (Eds.), *The handbook of self-regulation* (second edition): Research, theory, and applications (pp. 263–283). New York, NY: The Guilford Press.

Elias, C., & Berk, L. (2002). Self-regulation in young children: Is there a role for sociodramatic play? *Early Childhood Research Quarterly*, 17(2), 216–238.

Fantuzzo, J., Sekino, Y., & Cohen, H. (2004). An examination of the contributions of interactive peer play to salient classroom competencies for urban Head Start children. *Psychology in the Schools*, 41(3), 323–336.

Fitzpatrick, C., & Pagani, L. (2013). Task-oriented kindergarten behavior pays off in later childhood. *Journal of Developmental and Behavioral Pediatrics*, 34(2), 94–101.

Full-day early learning kindergarten program draft version (FDELK). (2010). Toronto, ON: Ministry of Education.

Gullo, D. F. (2006). K today: Teaching and learning in the kindergarten year. National Association for the Education of Young Children. Retrieved from http://www.naeyc.org/store/files/store/TOC/155_0.pdf

Hawes, Z., Gibson, A., Mir, S., & Pelletier, J. (2012). Children's experiences in full-day programs for 4- and 5-year-olds: Play and self-regulation. In Toronto first duty: Phase 3 report. Atkinson Centre for Society and Child Development, OISE, University of Toronto. Retrieved from http://www1.toronto.ca/City%20Of%20Toronto/Children%27s%20Services/Divisional%20Profile/Past%20Projects/firstduty/tfd_phase3report.pdf

Howse, R., Calkins, S., Anastopoulos, A., Keane, S., & Shelton, T. (2003). Regulatory contributors to children's kindergarten achievement. *Early Education and Development*, 14(1), 101–120.

Janus, M., & Offord, D. (2007). Development and psychometric properties of the Early Development Instrument (EDI): A measure of children's school readiness. *Canadian Journal of Behavioral Science*, 39(1), 1–22.

Karreman, A., van Tuijil, C., van Aken, M. A. G., & Dekovic, M. (2006). Parenting and selfregulation in preschoolers: A meta-analysis. *Infant and Child Development*, 15(6), 561–579.

Kegel, C., & Bus, A. (2013). Links between DRD4, executive attention, and alphabetic skills in a nonclinical sample. *Journal of Child Psychology and Psychiatry*, 54(3), 305–312.

Keller, H., Yovsi, R., Borke, J., Kartner, J., Jensen, H., & Papligoura, Z. (2004). Developmental consequences of early parenting experiences: Self-recognition and self-regulation in three cultural communities. *Child Development*, 75(6), 1745–1760.

Kochanska, G., Coy, K., & Murray, K. (2001). The development of self-regulation in the first four years of life. *Child Development*, 72(4), 1091–1111.

Lester, S., & Russell, W. (2008). Play for a change: Play, policy and practice – A review of contemporary perspectives. London: National Children's Bureau. Retrieved from <http://www.playengland.org.uk/media/120519/play-for-a-change-summary.pdf>

Lillard, A., Lerner, M., Hopkins, E., Dore, R., Smith, E., & Palmquist, C. (2013). The impact of pretend play on children's development: A review of the evidence. *Psychological Bulletin*, 139(1), 1–34.

Mashburn, A. J., Hamre, B. K., Downer, J. T., Pianta, R. C. (2006). Teacher and classroom characteristics associated with teachers' ratings of prekindergarten's relationships and behaviors. *Journal of Psychoeducational Assessment*, 24, 367–380.

McCain, M., Mustard, F., & McCuaig, K. (2011). Early years study 3: Making decisions, taking action. Margaret and Wallace McCain Family Foundation: Toronto, ON.

Merritt, E. G., Wanless, S. B., Rimm-Kaufman, S. E., Cameron, C., & Peugh, J. (2012). The contribution of teachers' emotional support to children's social behaviors and self-regulatory skills in first grade. *School Psychology Review*, 41(2), 141–159.

Miller, E., & Almon, J. (2009). Crisis in the kindergarten: Why children need to play in school. A report from the Alliance for Childhood. Retrieved from <http://files.eric.ed.gov/fulltext/ED504839.pdf>

- Moffitt, T., Arseneault, L., Belsky, D., Dickson, N., Hancox, R., Harrington, H., ...Caspi, A. (2010). A gradient of childhood self-control predicts health, wealth, and public safety. *Proceedings of the National Academy of Sciences*, 108(7), 2693–2699.
- Pagani, L., Fitzpatrick, C., Archambault, I., & Janosz, M. (2010). School readiness and later achievement: A French Canadian replication and extension. *Developmental Psychology*, 46(5), 984–994.
- Pascal, C. (2009). With our best future in mind. Implementing early learning in Ontario. A report to the Premier by the Special Advisor on Early Learning. Retrieved from http://ywcacanada.ca/data/research_docs/00000001.pdf.
- Pelletier, J. (2014a). Key findings from Year 3 of Full-Day Early Learning Kindergarten in Peel. Retrieved from http://www.oise.utoronto.ca/atkinson/UserFiles/File/Publications/Key_findings_Yr_3_Mar_14.pdf
- Pelletier, J. (2014b). Ontario's full-day kindergarten: A bold public policy initiative. *Public Sector Digest*, June Issue: Education, 41–49. Retrieved from http://www.oise.utoronto.ca/atkinson/UserFiles/File/Publications/6-2014_-_Ontario_s_Full-day_Kindergarten_A_Bold_Public_Policy_Initiative.pdf
- Pelletier, J., & Corter, C. (2005). Toronto first duty: Integrating kindergarten, childcare and parenting support to help diverse families connect to schools. *Multicultural Education*, 13(2), 30–37.
- Perry, K. E., Donohue, K. M., & Weinstein, R. S. (2007). Teaching practices and the promotion of achievement and adjustment in first grade. *Journal of School Psychology*, 45, 269–292.
- Pianta, R. C., La Paro, K. M., Payne, C., Cox, M. J., & Bradley, R. (2002). The relation of kindergarten classroom environment to teacher, family, and school characteristics and child outcomes. *The Elementary School Journal*, 102(3), 225–238.
- Pianta, R. C., & Stuhlman, M. W. (2004). Teacher-child relationships and children's success in the first years of school. *School Psychology Review*, 33, 444–458.
- Ponitz, C. C., McClelland, M. M., Mathews, J. S., & Morrison, F. J. (2009). A structured observation of behavioral self-regulation and its contribution to kindergarten outcomes. *Developmental Psychology*, 45(3), 605–619.
- Qu, L. (2010). Two is better than one, but mine is better than ours: Preschoolers' executive function during co-play. *Journal of Experimental Child Psychology*, 108(3), 549–566.
- Rhoades, B., Greenberg, M., & Domitrovich, C. (2009). The contribution of inhibitory control to preschoolers' social-emotional competence. *Journal of Applied Developmental Psychology*, 30(3), 310–320.
- Rimm-Kaufman, S. E., Curby, T., Grimm, K., Nathanson, L., & Brock, L. (2009). The contribution of children's self-regulation and classroom quality for children's adaptive behaviours in the kindergarten classroom. *Developmental Psychology*, 45(4), 958–972.
- Rimm-Kaufman, S. E., & Pianta, R. (2000). An ecological perspective on the transition to kindergarten: A theoretical framework to guide empirical research. *Journal of Applied Developmental Psychology*, 21(5), 491–511.
- Rimm-Kaufman, S. E., Pianta, R. C., & Cox, M. J. (2000). Teachers' judgments of problems in the transition to kindergarten. *Early Childhood Research Quarterly*, 15, 147–166.
- Robson, S. (2010). Self-regulation and metacognition in young children's self-initiated play and

reflective dialogue. *International Journal of Early Years Education*, 18(3), 227–241.

Rubin, K., Coplan, R., Fox, N., & Calkins, S. (1995). Emotionality, emotion regulation, and preschoolers' social adaptation. *Development and Psychopathology*, 7(1), 49–62.

Saez, L., Folsom, J. S., Otaiba, S., & Schatschneider, C. (2012). Relations among student attention behaviors, teacher practices, and beginning word reading skill. *Journal of Learning Disabilities*, 45(5), 418–432.

Silver, R. B., Measelle, J. R., Armstrong, J. M., & Essex, M. J. (2005). Trajectories of classroom externalizing behavior: Contributions of child characteristics, family characteristics, and the teacher-child relationship during the school transition. *Journal of School Psychology*, 43, 39–60.

Siraj-Blatchford, I. (2008). Understanding the relationship between curriculum, pedagogy and progression in learning in early childhood. *Hong Kong Journal of Early Childhood Education*, 7(2), 3–13.

South Australian Curriculum Standards and Accountability Framework (SACSA). (2009) *Learners and Learning in the Early Years*. Retrieved June 15, 2010, from http://www.sacsa.sa.edu.au/content/doc_fsrc.asp?ID=%7BDCB8452E-3D30-40E7-9C3C-570AE5168C17%7D&sec=%7B25AAFB50-4954-457F-9426-FDB72E5202EF%7D

Steglin, D. A. (2005). Making the case for play policy: Research-based reasons to support playbased environments. *Young Children*, 60(2), 76–86.

Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I., & Taggart, B. (2010). *Early childhood matters. Evidence from the effective pre-school and primary education project*. London: Routledge.

Thomas, L., Warren, E., & deVries, E. (2011). Play-based learning and intentional teaching in early childhood contexts. *Australasian Journal of Early Childhood*, 36(4), 69–75.

Thompson, R., & Goodvin, R. (2007). Taming the tempest in the teapot: Emotion regulation in toddlers. In C. Brownell & C. Kopp (Eds.), *Socioemotional development in the toddler years*. (pp. 320–344). New York, NY: The Guilford Press.

Williford, A. P., Whittaker, J. E., Vitiello, V. E., & Downer, J. T. (2013). Children's engagement within the preschool classroom and their development of self-regulation. *Early Education and Development*, 24, 162–187.

Wood, E. (2009). Conceptualising a pedagogy of play: International perspectives from theory, policy and practice. In D. Kuschner (Ed.), *From Children to Red Hatters©.Diverse images and issues of play*. Play and Culture Studies, Vol. 8. Maryland: University Press of America.

Appendix A

Self-Regulation Items
Emotional
<p>1. Calms self when faced with an emotional situation <i>e.g., when upset, hyperactive, or excited</i></p> <p>2. Appears comfortable and confident in the learning environment <i>e.g., does not appear overly shy, nervous, or tense, is not hesitant to enter play situations</i></p> <p>3. Considers others’ points of view and adjusts one’s own emotions and behaviours accordingly <i>e.g., rather than laughing chooses to help a peer that is hurt or upset</i></p> <p>4. When faced with a challenge (social, personal, or academic) the child is able to regulate their emotions to deal with the situation adaptively <i>e.g., asks for help if needed, uses self-talk, forgets running shoes on gym day and instead of panicking finds a way to deal with it</i></p> <p>5. Is able to work and play independently <i>e.g., if too many children are at a center the child is able to find an alternative activity, if child wants to play at the water table they will do so even if no one else wants to</i></p>
Social/Language
<p>6. Follows directions and expectations <i>e.g., helps to clean up after play, raises hand before speaking, sits still during carpet time</i></p> <p>7. Gets along well with peers <i>e.g., flexible with whom he/she interacts with, respects the property of others, is empathetic</i></p> <p>8. Uses a variety of strategies to solve social problems and conflicts <i>e.g., seeks help from adults or peers when needed, uses pictures and/or words to express feelings</i></p> <p>9. Listens and responds or acts appropriately during activities and discussions (small or large group) <i>e.g., doesn’t shout out, responses/actions are related to topic of discussion/activity</i></p> <p>10. During socio-dramatic play, is able to cooperate and negotiate roles with others <i>e.g., is willing to adapt their role to meet the play situation (doesn’t always have to be the lead), includes others in play situation, helps to set and follow play rules</i></p> <p>11. Does not seek excessive attention from the teacher <i>e.g., doesn’t asks questions when they know the answer, doesn’t follow the teacher around unnecessarily</i></p>
Cognitive
<p>12. Focuses and shifts attention as required <i>e.g., ignores distractions, doesn’t have a short attention span</i></p> <p>13. Makes decisions and choices for themselves <i>e.g., at play time doesn’t just stand as an onlooker, if given two alternatives is able to choose one</i></p> <p>14. Persists when faced with a challenge <i>e.g., completes a task once started, is motivated to learn new skills</i></p> <p>15. Inhibits impulses <i>e.g. at snack time doesn’t take food until their turn, doesn’t shout out, during physical activities and games is able to inhibit and regulate movements</i></p> <p>16. Flexible and adapts to changes <i>e.g., accepts a change in schedule or in the physical layout of the classroom, willing to be partners with a variety of peers (doesn’t always have to be with same person)</i></p> <p>17. Uses planning to achieve a goal <i>e.g., wants to build a big tower and thinks about the design before beginning</i></p>

*Items are adapted from Early Development Instrument (2006) and from the Ontario government ELECT (2006) document.

Appendix B

Child-Child Interactions

<p>Academic Interactions</p> <p>Numbers & Patterning Language & Literacy Science & Technology Art</p>
<p>Social Interactions</p> <p>Conversation Direction/Verbal Correction Physical/Gross-motor Praise, physical/verbal affection Negative peer physical/ verbal aggression</p>
<p>Play</p> <p>Dramatic Cooperative Associative/Parallel Solitary</p> <p>Dramatic Child plays with at least one other child in a manner that involves creating a dramatic situation and enacting roles in this situation. Children are pretending to be something else, and their roles complement each other. If a child is engaged in solitary dramatic play (e.g., playing in kitchen centre by herself) this is not scored (instead, score as solitary play).</p> <p>Cooperative Child plays with at least one other child in a game or activity that does not involve creating a dramatic situation. Examples include playing tag, playing together on a puzzle, working together to build something with blocks, etc.</p> <p>Associative/ Parallel Child plays in close proximity to another child (or children), either with the same materials or different ones. Children may occasionally converse, but do not actually play together.</p> <p>Solitary Child plays alone and is not interacting with peers. All types of solitary play are included in this category. It is important that the child is engaging in some sort of meaningful play activity, however (e.g., puzzles, going down the slide). Do not score purely functional behavior (e.g., child sitting by himself and clapping his hands).</p>

Appendix C

Child-Educator Interactions

<p>Academic Activities/Instruction</p> <p>Numbers & Patterning Language & Literacy Science & Technology Art Direct Instruction Questioning Conversation</p>
<p>Social Dimensions of Interaction</p> <p>Play Extension Play Participation Physical/gross-motor Praise-Affection, Physical/Verbal Self-management Prompt Correction/ Direct-Management</p>