PLAY, CREATIVITY, EMOTION REGULATION AND
EXECUTIVE FUNCTIONING

by

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Play, Creativity, Emotion Regulation and Executive Functioning

Abstract

by

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The aim of this study was to examine relationships among play, creativity, emotion regulation and executive functioning. Play ability was assessed using the Affect in Play Scale, Brief Rating (APS-BR), a measure used to score children’s cognitive and affective processes during play. It was hypothesized that results would show relationships among play ability, creativity, emotion regulation and executive functioning. Sixty-one female participants, in kindergarten through 4th grade, were assessed using the APS-BR, the Alternate Uses Test, a storytelling task, the Wisconsin Card Sorting Task, 64-Card Version (WCST-64), and parent report on the Emotion Regulation Checklist (ERC). Main findings were that play ability significantly related to creativity and emotion regulation, and creativity related to emotion regulation. No significant relationships were found with executive functioning. The results of this study contribute to the construct validity of the APS-BR and support the theory that play, creativity and emotion regulation are linked.
Play, Creativity, Emotion Regulation and Executive Functioning

A child’s imagination is something to be admired; however, the busy world in which children now live requires that they develop skills of inhibition, self-regulation and emotional control, in order to be successful in packed classrooms where individual attention is decreasing. It may seem that children must learn to balance their playful imaginations, and overflowing creativity with becoming smaller versions of self-controlled adults; however, it may be that instead of imagination and self-regulation being opposing forces, they are actually complementary tools for success. Perhaps those children with strong imaginations and good play skills are also more adept at developing mature executive functioning and emotional control, as they play their way to stronger skills of inhibition, interpersonal communication, emotion regulation, and organized planning.

The purpose of the present study was to examine the relationships among play, creativity, emotion regulation, and executive functioning. We predicted that play and creativity would be positively related, as has been established previously. We also predicted that both play and creativity would be positively related to emotion regulation. Further, we predicted that play and emotion regulation would be positively related to executive functioning.

Play

Pretend Play

While there are many types of play in which children engage, including puzzles, board games, or outdoor activities like playing tag, the current study focused on pretend play. Pretend play is defined as play that includes pretending, the use of fantasy and make-believe
and the use of symbolism (Russ, 2004). Fein (1987) described play as a symbolic act in which “one thing is playfully treated as if it were something else” (p. 282). For example, a child might pretend a block is a car. Thus, pretend play includes imagination and symbolism.

Russ (2004) outlines the cognitive, affective and interpersonal processes that are displayed through pretend play, describing what can be learned about a child by observing her pretend play. Cognitively, divergent thinking skills, the ability to use symbolism, the ability to pretend, and the ability to organize a logical story are all displayed through pretend play. Pretend play also illuminates children’s abilities to express emotion, regulate emotion, integrate affect into an appropriate context, and to play comfortably, experiencing enjoyment through play. Moreover, children can show their interpersonal skills through play by displaying empathy, communication, trust, and self-other differentiation. Lastly, pretend play allows for observation of how a child approaches problems and her ability to problem-solve effectively.

All of the skills listed above, which can be used during pretend play, are also relevant and important skills for “real life” and proper child development (Russ, 2004). Thus, a variety of studies have been conducted to examine the link between children’s play skills and their actual development, often viewing pretend play as “practice” for when similar situations arise in life. This idea stems from Lev Vygotsky (1930-1935/1978) who posited that play creates a zone of proximal development, in which children are able to behave at a level above that at which they can behave in real life activities. For example, a child may be able to tell her teddy bear he has to wait quietly for five minutes before he gets a cookie, and then do so herself, while in real life if asked to be quiet five minutes by a parent, this wait may seem unbearable.
Empirical studies support the assertion that pretend play is beneficial to child development in other areas, as well. For one, play is useful for children as a means of coping with stress (Young and Fu, 1988). This may be because symbolic play allows a child to act out situations and adjust to new feelings, within the safe world of play. Theoretically, play should relate to coping because skills developed while coping with pretend problems should carry over into real life problem-solving as well.

The Affect in Play Scale

Russ (1987, 1993) developed the Affect in Play Scale, a standardized measure of affect in pretend play. The task consists of asking a child to play freely for five minutes using two human puppets and three small blocks. An observer records the frequency of affective expression, the variety of affect categories expressed, and the mean intensity of the affective expression. Additionally, scores of fantasy are recorded, including scores of organization, elaboration, and imagination.

Research specifically using the Affect in Play Scale has confirmed many of the theories of how play relates to other aspects of child development (Russ, 2004). For example, play was found to positively relate to coping and negatively relate to distress (Christiano & Russ, 1996). In a sample of boys, those who expressed more affect in their play were found to have fewer pain complaints than boys with less affect in their play (Grossman-McKee, 1989). Further, this sample showed that better players were less anxious, leading to the conclusion that a child’s ability to express affect during pretend play is both associated with less anxiety and with fewer psychosomatic complaints.

Additionally, Seja and Russ (1999) found fantasy play to be significantly related to emotional understanding, even when controlling for verbal ability. Specifically, the cognitive
dimensions of fantasy play were significantly related to both one’s ability to describe emotional experiences and one’s ability to understand others’ emotions. Additional discussion of play ability and its links to other important developmental skills is presented in the following sections.

Creativity

Creativity can be difficult to define, since there is a subjective piece to whether something or someone is creative or not. However, one can make a distinction between the creative process and a creative product (Guilford, 1968). Russ (2004) explains that the creative process involves cognitive, affective and personality processes. Further, individuals who have good creative processes are more likely to produce a creative product. Russ asserts that “individual differences in these processes can be identified in children, and many of these processes are expressed and developed in pretend play” (p. 9).

Creativity is not usually measured directly, but through some of the many processes or skills that may be involved in producing something creative. These include divergent thinking, defined as generating multiple and varying ideas to a problem (Guilford, 1968). Creativity can also be measured through less structured tasks, such as storytelling, in which a child’s imagination and fantasy abilities can be observed and scored as objectively or as subjectively as one wishes. Divergent thinking and storytelling as measures of creativity are discussed further in the following section.

Creativity and Play

Play and creativity are naturally connected, as a child uses fantasy, symbolism, and divergent thinking to weave a context, story and characters. Thus, on a theoretical level, play
and creativity are related, in that many of the same processes are used. Previous studies have found a relationship between playfulness and creativity (Lieberman, 1977; Christie & Johnson, 1983). Pretend play could also be important in developing creativity, due to the overlap in both cognitive and affective processes (Russ, 1993).

Russ (2004), after reviewing the literature, concluded that there are five ways in which pretend play helps a child become more creative. First, practicing making associations is an important part of both play and divergent thinking. Secondly, pretend play leads to the use of symbols, the recombining of ideas, and the manipulation of object representations, which are part of transformation ability and insight ability, both creative skills. Additionally, play allows for the expression and experiencing of positive affect, which is also important in creativity. Pretend play allows the player to express and think about positive and negative affect themes, which over time lead a child to develop ability to access memories and associations which help creative problem-solving. Lastly, pretend play helps a child to develop cognitive structure that enables the child to contain, integrate and modulate affect. These points suggest that since affect is both a big piece of what makes good pretend play, and is important for creativity, play and creativity are related as well.

Mood and mood induction research have supported this idea that affect during play is related to creativity. For example, Russ and Kaugars (2001) found that self-reported mood during a play or puzzle task, was significantly associated with originality of divergent thinking.

**Divergent Thinking** - Divergent thinking is defined as thinking that generates a variety of ideas and associations to a problem (Guilford, 1968). Because divergent thinking involves free association, broad scanning ability, and fluidity of thinking, it can be used as a
measure of creativity. It has also been found to be relatively independent of intelligence (Runco, 1991).

D. Singer and J. Singer (1990) assert that there are many areas of cognitive development that pretend play helps to build, including object constancy, problem solving and divergent thinking. Theoretically, pretend play and divergent thinking logically relate, as play leads to the practice of divergent thinking through the creation of alternate story endings, or using the same object as multiple props. As well, pretend play leads to the expression of both affect states and affect-laden fantasy which could help a child develop a variety of affect-laden associations, which should then facilitate divergent thinking.

Russ and Grossman-McKee (1990) found that affective expression in play was positively related to divergent thinking, using the Affect in Play Scale and an Alternate Uses Task. Russ and Peterson (1990) replicated these results with a larger sample, and confirmed that the relationship between affective expression in play and divergent thinking is independent of intelligence. In a study by Russ and Schafer (2006) expression of affect in play was found to be related to divergent thinking. Specifically, the level of negative affect in the child’s pretend play was found to be significantly related the child’s ability to both generate uses and to the originality of those uses. Play also related to divergent thinking in a preschool sample (Kaugars & Russ, in press).

Additionally, Russ, Robins and Christiano (1999) performed a longitudinal study in which children who expressed more affect and a higher quality of fantasy score as first and second graders, using the APS, were found to show more affect and quality of fantasy in play stories as sixth and seventh graders, suggesting that early processes of pretend play are similar to later processes of fantasy. Further, pretend play was found to be predictive of
divergent thinking over time. Not only does pretend play simply relate to divergent thinking, but play has actually been found to facilitate divergent thinking (Dansky, 1980; Dansky & Silverman, 1973).

**Storytelling** - Divergent thinking is only one method of measuring creativity. Storytelling is another domain of creativity, as a child’s story can excel in a variety of creative ways, including fantasy, novelty, imagination, and likeability. In a meta-analysis on mood and creativity, Baas, De Dreu & Nijstad (2008) break creativity into three domains: tasks that are open-ended, such as divergent thinking; tasks that have a single correct solution, such as insight tasks; and creative performance tasks in which creativity is based on others’ evaluations, such as storytelling or art. The authors further assert that it is important to distinguish between these different facets of creativity because it is possible that each may be the function of different psychological processes.

The componential theory of creativity (Amabile, 1983a, 1983b) posits that a creative response to a task is a function of three components: domain-relevant skills, creativity-relevant skills; and task motivation. As with other tasks, evidence shows that intrinsic motivation will lead to better task performance than extrinsic motivation. Thus, a given performance on a creativity task depends both on skill and motivation. Hennessey and Amabile (1988) argue therefore that creativity tests which are too standardized to look at skill may be sensitive to between-subject differences but insensitive to between-group differences. For this reason, a storytelling task can be a welcome addition to a creativity assessment, in that it does not rely heavily on age-relevant skills. In fact, in three studies completed by Hennessey and Amabile (1988), correlations between subject age and story creativity as well as between subject sex and story creativity were nonsignificant. Amabile stressed that for
this type of storytelling measure, it is important that no criteria be used to anchor the rating scale.

This theory gained support from a recent study in which the Alternate Uses Task and this type of consensus scoring system on a storytelling task were found not to relate to one another (Russ, Robins, & Christiano, 1999). The authors suggested that the divergent-thinking task measured one, specific ability important to creativity, while the storytelling task was more multidimensional and broad. However, analyses and results from this study were weakened by a lack of inter-rater reliability among the teachers who rated the stories. However, it is possible that a change in the scoring system for the storytelling task, or better inter-rater reliability among the raters, would show a connection between storytelling and play. In the past, storytelling tasks have been used widely for their linguistic assessment value (e.g. Justice et al., 2006; Paul, Hernandez, Taylor & Johnson, 1996); however, the ability to verbally create a story with unique details and novel events is clearly a creative process leading to a creative product.

Using elementary school teacher ratings on nine dimensions (creativity, liking, novelty, logic, emotion, grammar, detail, vocabulary, and straightforwardness), Hennessey and Amabile (1988) were able to show large differences between low and high creative stories on a storytelling task. As well, the results showed strong inter-rater reliability between teacher-raters, ranging from .73-.91, with six of the nine reliabilities above .85, showing that there was considerable consensus about what is creative. The authors went on to do a factor analysis of the nine dimensions and found that three clear factors emerged: creativity, factual detail, and technical goodness, which together, accounted for 75% of the variance in judges’ ratings. Four of the ratings loaded high and positively on the creativity
factor: the creativity of the story, the imagination demonstrated by the storyteller, the novelty of the idea, and the degree to which the teacher liked the story. Therefore, to use storytelling as a measure of creativity, only these four rating variables were used in the present study.

On a theoretical level, storytelling and play seem to overlap quite a bit. As a child engages in pretend play, they are often developing a story, with characters, details, emotions, and fantasy. Much of play is storytelling. Further, just as divergent thinking has been found to relate to play, theoretically, storytelling, should also relate to play as it is another form of creativity. Russ, Robins, and Christiano (1999) found some connections between the Affect in Play Scale and storytelling. The APS was moderately related to the presence of emotion in the story, the amount of detail, and the straightforwardness. Further, the comfort score was able to significantly predict the creativity of the story.

Executive Functioning

Executive Functioning

Executive functioning refers to a large set of abilities including planning, persistence, mental flexibility, working memory, set shifting, error detection and correction, and inhibitory control. It has been defined as the conscious control of thought and action needed for future-oriented and purposeful behavior (Welsh, Pennington, & Groisser, 1991; Zelazo, Carter, Reznick & Frye, 1997). Executive functioning is required for goal-directed behaviors and for solving novel problems. Executive functioning can be especially important for inhibiting automatic or established thoughts and responses.

Executive functioning often comes up in cases involving brain injuries where certain executive functioning skills have been lost. However, we are not born with impeccable
executive functioning; as children age, their executive functioning skills develop and mature. Reed, Pein and Rothbart (1984), show that young three-year-olds have difficulty inhibiting their actions in the Bear/Dragon task (a version of Simon Says in which children follow instructions from the bear puppet but do not follow instructions from the dragon puppet), while older 3-year-olds and four-year-olds are able to selectively follow or not follow such commands. Upon leaving preschool, children should have the self-regulation to wait their turn to play with a desired toy, resist the urge to grab or hit other children, clean up after themselves, and persist at something they find challenging (Berk, Mann & Ogan, 2006).

A great many processes go into the development of executive functioning in young childhood. Language development in particular has been examined in depth. Many theories suggest that language facilitates the development of self-regulation (e.g. Piaget, 1936/1951; Vygotsky, 1934/1986). Vaughn, Kopp & Krawkow (1984), write that increases in self-control, measured by a child’s capacity to delay gratification, correlate with early language progress.

*Executive Functioning and Play*

Executive functioning abilities and play should also relate, as both follow predictable trajectories through the preschool years (Hughes, 1999). However, few studies have investigated this possible link, and the majority of studies published report only assessing preschool children. Thus, the relationship between play abilities and executive functioning skills in older children remains largely unexplored.

Theoretically, pretend play appears to have the potential to bolster executive functioning abilities. As discussed earlier, Vygotsky (1930-1935/1978) theorized that pretend play served as a zone of proximal development, and a time to practice skills which
can be generalized to real life. Empirical studies confirm this theory that play can lead children’s development forward as they build skills during play that can then be applied to later non-pretend situations. Ruff and Capozzoli (2003) tested 172 children from 10 months of age to 42 months as they played with toys. They found that as children aged, their attention spans increased and their distractibility decreased, with the 42-month-old children being the most focused in the presence of distracters.

According to Vygotsky (1962), pretend play and imagination are important to a child’s development, just as any other skill, as children make up their own goals, actions, consequences, problems and solutions while playing. These make-believe situations, predicaments and solutions can be seen as practice for real life situations that children may face. Kraft and Berk (1998) add that during pretend play episodes, children often follow social rules established by the context of their story and the other children with whom they are playing, developing yet another skill that will benefit them in real life.

This idea that pretend playing different episodes is like practice for real life has been studied further. Elias and Berk (2002) and Rosen (1974) have both studied the influence of pretend play on self-regulation abilities of children in other contexts. For example, when a child makes up a story and sets a context, such as playing house and being the mother role, they then must regulate their behavior so that it is appropriate for the setting they’ve conceived. This builds both the skills of assessing a situation for the correct role behaviors, and the ability to behave according to those norms.

Flexibility in problem-solving has also been related to play (Pelligrini, 1992). It has been found that the use of pretend play as a strategy improves the quality of problem-solving. The development of creativity in pretend play promotes self-regulation, and problem-solving
in subsequent activities. This was found to be true for both normally developing children and for children with intellectual disabilities (Vieillevoye, Nader-Grosbois, 2008).

One model of play suggests that it contains four components: nonliterality, positive affect, intrinsic motivation and flexibility (Krasnor & Pepler, 1980). Using this view, play can be used in three ways: as a diagnostic tool that reflects the developmental level of the child, as a technique to practice skills, and as a tool to create developmental change.

Emotion Regulation

*Emotion Regulation*

Emotion regulation is the ability to manage one’s emotional experiences in order to engage adaptively within the daily environment (Shields & Cicchetti, 1998). Saarni (1984) defines emotion regulation as “regulating the experience of emotion by monitoring one’s expressive behavior.” This view of emotion regulation suggests that both internal regulatory factors and external environmental factors have roles. For example, not only does emotion regulation include the development of self-regulation, but it also includes factors such as cultural display rules, defined by Ekman and Friesen (1969), as social conventions that dictate, where, when and how emotion-related behaviors should be expressed.

Like executive functioning, emotion regulation develops through childhood. Saarni (1984) used a disappointment paradigm in which children were given an undesirable gift. While the six-year olds (especially the boys) were openly negative in their expressions, older children showed transitional behavior in which arousal level was apparent (e.g. lip biting) but was less overtly negative, and it was not until 10-11 years of age that children were able to exhibit positive behavior (e.g. exaggerate a smile) despite feeling disappointed internally.
It appears that the ability to regulate one’s emotions during a social interaction is an important part of a general group of abilities called “affect management skills” (Parke et al., 1992). Also included in these skills is the ability to identify emotional expression in others and to understand the causes of emotions. Emotion regulation is important because empirical evidence shows that a child’s ability to regulate her own emotional state is essential in the formation of positive peer relationships (Eisenberg et al., 1993; Fabes et al., 1999).

Emotion Regulation and Play

Similar to how play enables children to practice and build executive functioning skills, pretend play gives children the opportunity to act out emotional experiences. It has been hypothesized that pretend play can work as a social interaction that can enhance a child’s abilities to regulate emotion (Galyer & Evans, 2001). In their study, pre-school children were assessed for emotion regulation and observed during pretend play with their parents. Children’s pretend play was related to emotion regulation skills; specifically, children who engaged in pretend play with their parents more often were found to have higher ratings of emotion regulation.

Other theorists have corroborated this assertion, arguing that pretend play offers children the opportunity to develop emotion regulation skills by letting them symbolically create and then modify highly arousing emotional events, and negotiate rules or agree upon the direction of play with another person (Bretherton, 1989; Fein, 1989; Howes & Matheson, 1992). Lindsey and Colwell’s (2003) study found that girls who engaged in high levels of pretend play were rated by their mothers as being better at regulating emotion.

Little research has examined how children’s pretend play when they are playing alone, or when they are in a slightly older age group (six to ten years old) might relate to
emotion regulation. However, theoretically the two variables should be related, as research has shown that play is a safe arena in which to experiment with and control negative affect (Bretherton & Beeghly, 1989; Fein, 1989). Further, more recent research has shown a link between high levels of sociodramatic play and conflict resolution and good emotional self-regulation in preschoolers (Fantuzzo, Sekino & Cohen, 2004; Lemche et al., 2003).

Emotion Regulation and Executive Functioning

Because emotion regulation also develops in childhood, Carlson and Wang (2007) assert that emotion regulation is particularly likely to be related to executive functioning. According to Carlson and Wang (2007) both are skills that develop through childhood. Children at age 3 have difficulty when asked to perform tasks requiring inhibitory control of attention or motor responses, but are able to perform these tasks at age 5. Simultaneously, children improve at regulating emotions by monitoring their expressive behavior. Carlson and Wang (2007) found that inhibitory control and emotion regulation were significantly correlated, even controlling for age and verbal ability, and for both positive and negative emotional expression. This suggests that attention, inhibition and emotion are skills that develop together during preschool.

Most research on the development of executive functioning has been separate from the research on the development of emotion regulation. However, theoretically, the two are interlinked. Since the definition of emotion regulation includes monitoring one’s behavior in addition to regulating the experience of emotion, it seems clear that there are not only affective processes, but cognitive and behavioral processes as well. As well, the definition of executive functioning includes inhibition, and persistence, suggesting not only a cognitive
piece, but emotional and behavioral pieces as well, and thus again positing a link between executive function and emotion regulation.

Developmental cognitive neuroscience supports the assertion that executive functioning and emotion regulation are connected. Emotion and cognition are intricately linked and work together to process information and execute action (Bell & Wolfe, 2004; Cacioppo & Bernston, 1999). In addition, it seems likely that emotion regulation and executive functioning both influence each other: emotion can be used to help organize one’s thinking, learning and actions, but cognitive processes also feed back into regulating one’s emotions.

Zelazo and Cunningham (2007) have proposed a model in which emotion is the motivational aspect of cognition for goal-directed problem-solving. This view suggests that emotion regulation can either be primary or secondary, but is always at least partially linked to executive functioning. For example, in every day problem solving, emotion regulation is seen as secondary to executive functioning, providing either motivation, or self-control to persevere, or the ability to suppress frustration. However, sometimes the “problem” that needs to be solved is that one is very upset and needs to calm down: in this case, the emotion regulation is seen as primary, but is still linked to executive functioning in terms of goal-directed behavior. This model, like the neuroscience perspective, also supports the idea that executive functioning and emotion regulation have a reciprocal relationship, it which both are able to influence each other depending on the type of problem to be solved.

Summary
Research has shown that pretend play is important for child development. Specifically, pretend play has been linked to creativity and emotion regulation in past studies. The research indicates that children who are better players tend to be more creative and to be better able to self-regulate. In turn, creativity and emotion regulation are important pieces of executive functioning through their impact on inhibition, goal-directed behavior, problem-solving and mental flexibility. Therefore, play that leads to better creativity and emotion regulation, should also lead to better executive functioning. Past research has examined each of these components, play, creativity, emotion regulation, and executive functioning, but this study aims to examine the interrelationships among all four components in children six to ten years of age.

Hypotheses

It was hypothesized that play would be positively related to creativity, emotion regulation and executive functioning. Additionally, we predicted that emotion regulation would be positively related to executive functioning. A secondary hypothesis was that the two measures of creativity, storytelling and divergent thinking, would be positively related.

Method

Participants

The participants for the study were 61 students from Laurel School, a private school for girls, in kindergarten through fourth grade. A power analysis done with G*Power indicated that 64 participants would provide 0.80 power for a medium effect size. All girls in those grades, who were between the ages of five and ten, were given recruitment letters
and consent forms to take home for their parents to sign. Those children whose parents consented to the study were given packets to be filled out by their parents. The participation rate based on the number of recruitment letters originally sent out to parents was 43%. This study was part of the baseline data collected as part of a larger research project at Laurel School examining a 4-session play intervention.

Procedure

To collect the baseline data, each participant was met with individually for two half-hour sessions. During the first session, a play task, The Affect in Play Scale, Brief Rating Version (Sacha Cordiano, Russ & Short, 2008) was administered in addition to other baseline measures not included in the present study. During the second meeting, a measure of executive functioning, the Wisconsin Card Sorting Task 64 card edition (WCST-64; Haaland, Vranes, Goodwin & Garry, 1987); a storytelling task to measure creativity, using Mayer’s (1967) book A Boy, A Dog and a Frog; and a divergent thinking task to measure creativity, Wallach and Kogan’s (1965) adaptation of Guilford’s Alternate Uses Task were all administered. The Vocabulary subtest of the Wechsler Intelligence Scale for Children (WISC-IV) was administered to the majority of children during their first session; however, if time ran out during the first session, children received the Vocabulary subtest during their second session instead. Measures were scored blind to the participant’s performance on other tasks.

The present study had one examiner who administered the play task to all the participants, but two examiners were involved in the administration of the assessments included in the second half-hour session. 39% of the participants met with different examiners for their first half-hour session and their second half-hour session, while the
remaining 61% of participants met with the same examiner on both meetings. A comparison of means on each of the variables included in the baseline assessments revealed there were no significant experimenter effects on the children’s scores.

In addition, the parents were given a packet to fill out after their consent form was returned which included a measure of emotion regulation, The Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1998). See Table 1 for a summary of measures and scores.

*Measures*

**Affect in Play Scale – Brief Rating Version (APS-BR)** – a standardized play task that assesses fantasy and affect in play in children ages six through ten (Sacha Cordiano, Russ & Short, 2008; Sacha Cordiano, 2008). For this task, children were given three blocks and two puppets, and the following instructions:

“I am here to learn about how children play. I have here two puppets and would like you to play with them any way you like for five minutes. For example, you can have the puppets do something together. I also have some blocks that you can use. Be sure to have the puppets talk out loud. I’ll tell you when to stop.”

The APS-BR is adapted from the Russ’ (1993) video-taped version of the Affect in Play Scale so that the play can be scored as it occurs, instead of being scored afterward from the videotape. This allowed for the study to include participants who did not wish to be videotaped. There are five main scores that examine both affective and cognitive aspects of the child’s play, each of which is scored on a Likert scale from 1 to 4. These five scores are: Frequency of Affect, Tone of Affect, Organization, Imagination, and Comfort. Frequency of Affect looks at the amount of emotion expressed during the play, and is scored based on a tally of how much emotion the children expresses during the play task. The Tone of Affect
score rates whether the overall tone of the play was positive or negative, with higher scores indicating more positive affect. The Organization score rates the plot and complexity of the child’s story, looking at cause and effect, and the relatedness of individual events within the play. The Imagination score rates the child’s ability to use pretend and fantasy elements in their play such as adding additional characters or using the blocks to symbolically represent other things, and rates how novel and unique this fantasy is. Lastly, the Comfort score is an overall rating of how easily the child was able to become engaged in and enjoy the play.

The video-taped APS has been validated using divergent thinking and storytelling in the past (e.g. Russ, Robins, Christiano, 1999). More importantly, the APS-BR has been found to correlate highly with the video-taped version with correlations ranging from .75 to .92, making the APS validity studies still relevant when discussing the new brief rating version. In addition, more recently, the APS-BR itself has been found to relate to levels of creativity and emotional memories (Sacha Cordiano, Russ & Short, 2008), and to openness to experience (Sacha Cordiano, 2008). For the present study, inter-rater reliability was calculated by having another observer rate 20 of the participants. In the past, inter-rater reliability has been good, ranging from .62 to .94 (Sacha Cordiano, Russ and Short, 2008).

**Wisconsin Card Sorting Task, 64 Card Version (WCST-64).** The WCST-64 is a measure of executive functioning in which participants are asked to sort sixty-four cards by color, shape, or number into piles, based on 4 key cards. The WCST-64 is a shortened version of the original 128-card version of the Wisconsin Card Sorting Task (WCST; R. K. Heaton, 1981). It was first reported by Haaland, Vranes, Goodwin and Garry (1987). For this task, the four key cards are a card with one red triangle, a card with 2 green stars, a card with three yellow crosses, and a card with four blue circles. Each of the 64 cards to be sorted
contain either 1, 2, 3 or 4 circles, stars, triangles or crosses that are either red, green, yellow or blue. The participant must decide how to sort the cards, by shape, color or number, following only these instructions:

“This test is a little unusual because I am not allowed to tell you very much about how to do it. You will be asked to match each of the cards in this deck (experimenter points to the response card deck) to one of these four key cards (experimenter points to each of the stimulus cards in succession, beginning with the red triangle). You must always take the top card from the deck and place it below the key card you think it matches. I cannot tell you how to match the cards, but I will tell you each time whether you are right or wrong. If you are wrong, simply leave the card where you have placed it and try to get the next card correct. There is no time limit on this test. Are you ready? Let’s begin.”

The standardized protocol is that participants should first match cards based on color, then after getting ten in a row correct, the experimenter shifts so that the participant should match the cards by form, and then after another ten in a row correct, by number. This continues until all 64 cards have been sorted. The experimenter does not tell the participant when the task is switching. As the participant places each card, the examiner records where the card was placed, and gives the participant feedback that they have placed the card correctly or incorrectly.

The WCST-64 yields ten major scores; however, only two of them were used in the present study, since many of the scores are related to each other and using each of them would cause much overlap. The first score that was used in this study was Perseverative Responses, which were scored as any time that a participant persisted in responding to a stimulus characteristic that was incorrect. For example, after sorting 10 cards correctly by
color, the experimenter would shift the set to form, but the participant may continue to sort by color despite feedback that she is sorting incorrectly. Because sometimes a card will match a key card on more than one characteristic, not all perseverative responses end up being incorrect. Thus, both the number of perseverative responses and the number of perseverative errors can be calculated, but these numbers will be highly related, thus only perseverative responses were used in the present study’s analyses.

Second, the study used a score called “Conceptual Level Responses” which were defined as consecutive correct responses occurring in runs of three or more. These are thought to reflect a participant’s insight into the correct sorting principle better than simply counting the total number of correct answers given, since some individual correct answers may be achieved by mistake, but three correct answers in a row by guessing would be unlikely.

Past studies using factor analyses of all ten WCST-64 scores found three main factors (Greve et al, 1998; Sullivan et al., 1993). Factor 1 reflected executive functioning, specifically the ability to shift response set and respond flexibly to changing test requirements and to problem-solve. The second factor was represented by Nonperseverative Errors, incorrect card placing not based on the most recent sorting principle, and the third factor loaded significantly on the Failure to Maintain Set score, or when participants would get five correct responses but then change their strategy despite positive feedback that they were sorting correctly. Thus, for the purposes of this study, and the purposes of examining executive functioning, the scores under Factor 1 were the focus.

The WCST-64 is appropriate for people ages 6-89, and thus is mostly appropriate for the present sample. Those five year olds included in the study who did not do well on the
task were excluded from analyses. The normative data for children and adolescents is composed of 452 normal children and adolescents from public schools in the United States. Studies have shown that the 64-card version is generally comparable to the standard version (e.g. Heaton and Thompson, 1992; Axelrod, Henry & Woodard, 1992), which is logical because it has all the same features but is just the first 64 cards of the 128 card version. Thus, past validity studies for the original Wisconsin Cart Sorting Task can be applied to the 64 card version as well. In a 2002 study, Axelrod found the correlation between the original WCST and the WCST-64 scores for perseverative responses to be .87, and the correlation between WCST percentages of Conceptual Level Responses and the percentage on the WCST-64 to be .86.

Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1998) – The ERC is a parent report for assessing emotion regulation. The scale is comprised of 24 items, each using a four-point Likert scale from Never (1) to Almost Always (4). Parents are asked to rate how often their child displays certain behaviors which are related to developmentally appropriate reactions during positive and negative emotions, (e.g. “Can modulate excitement in emotionally arousing situations”, or “Responds angrily to limit-setting by adults”). The items on the scale are divided into two subscales: Lability/Negativity and Emotion Regulation, with higher scores indicating greater abilities to regulate emotions. In addition, a Total score can be calculated by reverse scoring the items on the Lability/Negativity subscale and adding all the checklist items together. The present study used only the Emotion Regulation subscale as a measure of emotion regulation.

Previous research shows the ERC to have good psychometric properties. Shields and Cicchetti, 1997) reported high internal consistencies of .96 for the Lability/Negativity...
subscale, and .83 for the Emotion Regulation subscale. Additionally, they found that these two subscales are significantly negatively correlated: $r = -0.50$. Further, a composite emotion regulation score can be calculated by reverse coding all of the negatively worded items, and summing all 24 items. Shields and Cicchetti (1997) found this composite ERC score to have an internal consistency of .89. They have also demonstrated that the ERC has good construct validity, correlating it with parent ratings on the Child Behavior Checklist and observer ratings of emotion regulation in a free-play situation.

**Alternate Uses Task** – The Alternate Uses task is the most widely used measure of divergent thinking. The task asks children to think of uses for six common objects: a newspaper, a button, a key, a shoe, an automobile tire, and a knife. This version of the task uses Wallach and Kogan’s (1965) adaptation of Guilford’s Alternate Uses Test. There was no restriction on the amount of time children have to respond to the items. The instructions were as follows:

“Now, I am going to name an object, any kind of object, like a light bulb, and it will be your job to tell me all the different ways that the object could be used. Any object can be used in a lot of different ways. For example, think about a string. What are some of the ways you might use string? (child tries). Yes, those are fine. You can also use string to attach a fish hook, to jump rope, to sew with, to hang clothes on, and to pull shades. There are lots more too and yours were good examples. Now I’m going to name different objects and I want you to tell me all the different ways you could use the object that I name. Newspaper – All the different ways you can use a newspaper. (Prompt on the first two – Can you think of anything else?)”
Three scores were calculated from the child’s responses to the six items. The first was a Fluency score determined by the number of acceptable uses the child generated. Second was a Flexibility score determined by the number of different categories of uses generated by the child. For example, a child might say that a newspaper could be folded to make a paper hat, and folded into a paper airplane; they would receive two points for Fluency for giving two acceptable answers, but one point for Flexibility as both these answers involve folding the paper into something. Third, an Originality score was calculated, determined by the number of acceptable uses that were considered rare in that they made up only 1% or less of all the responses given for an item. The Alternate Uses Test has excellent reliability and validity, shown in many studies conducted with children (Kogan, 1983; Runco, 1991).

**Storytelling Task** – The storytelling task was used as a measure of creativity. Children were asked to look through a picture book and tell a story that goes along with the pictures. For this study, we used Mercer Mayer’s (1967) book *A Boy, a Dog and a Frog*. The instructions for the task were:

“I want you to tell me the story in this book. I can’t see the pictures so make sure to tell me the story so that I will understand it. Make it the kind of story we would read in a book.”

Children were instructed to tell a story for the first half of the book. This was to reduce the amount of time that this task would take, and to reserve the second half of the book to collect outcome data for the larger study, in which this research is a part, without creating practice effects of telling the same story twice.

In the past, storytelling has been rated on 9 dimensions delineated by Hennessey and Amabile (1988), outlined above. Russ, Robins and Christiano (1999) used this same scoring
system to measure creativity. However, this scoring system requires that 3 school teachers, familiar with children’s writing score all of the stories and in this study, the inter-rater reliability among teachers was low. Additionally, since the factor analysis completed by Hennessey and Amabile (1988) showed that only four of the rating dimensions loaded onto the “creativity” factor, it is not necessary to score all nine dimensions to assess storytelling creativity.

Instead, for the present study, two scoring methods were used: one with clear criteria for scoring and one without clear criteria based on subjective ratings. Firstly, the stories were rated using fantasy and affect measures derived from the Affect in Play Scale. Previously, TAT stories were coded by a method developed by Katz (1991) which measured amount of fantasy, amount of affect, and intensity of affect, conceptualized from the affect measures on the Affect in Play Scale (Katz, Russ & Overholser, 1993). A scoring manual with spelled out criteria for each of the variables was developed (Katz, 1991). An adapted version of this scoring system was applied to the stories derived from the current storytelling task. Stories were coded for the amount of affect expressed, divided into Direct Affect and Implied Affect. For example, a direct affect statement might be, “Then the boy got really mad”, while an Implied Affect statement would be, “The boy yelled at the frog,” implying anger but not directly stating such. The amount of both direct and implied affect were then totaled to form a Total Affect score. Affect was also coded by type, using the 11 possible categories from the Affect in Play Scale, allowing a Variety of Affect score to be calculated based on how many different categories of affect were found in the child’s story. Lastly, a Fantasy score, on a 1 – 3 Likert scale was assigned, with a 1 meaning there was no fantasy in the story or the child simply summarized what was happening in each picture; a 2 was for
stories with some fantasy elements, dialogue or novel ideas, and a 3 was for stories with high amounts of fantasy, including dialogue, back stories on the characters, or including plot elements not found in the storybook pictures. In addition, the length of the stories, measured in number of words, was recorded.

The second method for scoring the creativity of the stories was using two clinical psychology graduate students from the Case Western Reserve University psychology department who had past experience with children and creativity. The raters scored the stories on the four factors which Hennessey and Amabile (1988) found to load highly on a creativity factor: the creativity of the story, the imagination demonstrated by the storyteller, the novelty of the idea, and the degree to which the rater liked the story. These were all 5-point Likert scales, with higher scores indicating more creativity, imagination, novelty and likeability. Raters were not given concrete scoring directions, but were told to rate the stories relative to each other, not to an outside standard.

Specific Hypothesis

1. The first hypothesis was that the APS-BR scores would positively correlate with the creativity scores.
   a. It was hypothesized that there would be significant positive correlations between APS-BR scores of Organization, Imagination and Frequency of Affect and divergent thinking scores of Fluency, Flexibility, and Originality.
   b. It was hypothesized that there would be significant positive correlations between APS-BR scores of Organization, Imagination and Frequency of Affect and storytelling scores using the Katz (1991) adaptation of the APS-BR
scores (Direct Affect, Implied Affect, Total Affect, Variety of Affect and Fantasy).

c. It was hypothesized that there would be significant positive correlations between APS-BR scores of Organization, Imagination and Frequency of Affect and storytelling scores using the Hennessey and Amabile (1988) score system scores (Creativity, Imagination, Novelty and Likeability).

2. Second, it was hypothesized that the APS-BR scores (Organization, Imagination, Frequency of Affect, Comfort and Tone) would significantly positively correlate with the Emotion Regulation subscale score on the Emotion Regulation Checklist.

3. Third, it was hypothesized that APS-BR scores would significantly correlate with executive functioning as measured by the Wisconsin Card Sorting Task – 64 Card Version.

   a. There would be significant negative correlations between APS-BR scores of Organization, Imagination, and Frequency of Affect and the executive functioning score of Perseverative Responses.

   b. There would be significant positive correlations between APS-BR scores of Organization, Imagination, and Frequency of Affect and the executive functioning score of Conceptual Level Responses.

4. Fourth, it was hypothesized that the Emotion Regulation subscale score from the Emotion Regulation Checklist would significantly correlate with scores of executive functioning, as measured by the WCST-64.
a. There would be a significant positive correlation between the Emotion Regulation subscale score and the executive functioning score of Conceptual Level Responses.

b. There would be a significant negative correlation between the Emotion Regulation subscale score and the executive functioning score of Perseverative Responses.

5. Fifth, it was hypothesized that the two measures of creativity (divergent thinking and storytelling) would be significantly positively related.

a. There would be significant positive correlations between divergent thinking scores of Fluency, Flexibility and Originality and storytelling scores using Katz’s (1991) scoring adaptation of the APS-BR scores (Direct Affect, Implied Affect, Total Affect, Variety of Affect and Fantasy).

b. There would be significant positive correlations between divergent thinking scores of Fluency, Flexibility and Originality and storytelling scores using Hennessey and Amabile’s (1988) scoring system scores (Creativity, Imagination, Novelty and Likeability).

Results

The data analytic plan was designed to test the proposed relationships among play, creativity, executive functioning and emotion regulation and the secondary hypothesis of interrelationships between the multiple measures of creativity. Exploratory analyses were run to examine relationships between creativity and executive functioning and to determine the effects of grade on the major variables, and to investigate the possibility of a fourth grade
slump (Torrance, 1968), the idea that due to pressures of conventionality, fourth graders creativity may be cut short (Runco, 2007). Data considerations and psychometrics of the measures are presented first. Then, to determine if sufficient variability existed in the data, descriptive statistics for the variables are described.

Pearson product-moment correlations were used to test for significant relationships among the play, creativity, emotion regulation and executive functioning measures. Data was checked for skewness and kurtosis. An alpha value of .05 was used for all statistical tests.

Data Considerations

In the sample of 61 participants, there were missing data for the play task, Wisconsin Card Sorting Task, Alternate Uses Task, Storytelling Task, and Emotion Regulation checklist. For the play task, there were 2 participants who did not wish to participate and thus did not receive scores, so 59 participants were included in the data analyses involving the Affect in Play Scale, Brief Rating. 12 parents did not return the Emotion Regulation Checklist that was sent home, and 2 parents who did return the Emotion Regulation Checklist, left crucial items blank. Thus, 47 participants were included in the data analyses involving the Emotion Regulation Checklist. 3 participants were not able to complete the Wisconsin Card Sorting Task: one child quit the task half-way through, and two children were mistakenly recorded as having already completed the task despite having never participated. In addition, 4 kindergarteners who were 5-years-old were too young to successfully complete the card sorting task which is validated for children 6 and up, leaving 54 participants included in the data analyses involving executive functioning. 2 participants did not wish to complete their stories for the storytelling task, and the same 2 children who
were mistakenly recorded as completing the WCST-64, were also missed again, and thus did not complete the storytelling task, leaving 57 participants to be included for data analyses involving the storytelling task. Similarly, the same 2 participants recorded incorrectly did not participate in the Alternate Uses Task, so 59 participants were included in the data analyses.

*Composite Scores*

Composite scores were calculated for the storytelling task scores given by the two graduate student raters. Since both raters scored all 57 stories collected, and were highly correlated in their rating of these stories (see Table 2), the raters’ scores were averaged to create composite scores of Creativity, Novelty, Imagination and Likeability.

*Psychometric Properties of Affect in Play Scale Measure*

Interrater reliability was assessed using a rigorous form of intraclass correlation coefficient that measures absolute agreement, rather than just consistency between raters (Shrout and Fleiss, 1979). A two-way random effects model was used, testing for absolute agreement using a 95% confidence interval. The average scores for the intraclass coefficients were: .70 for Organization, .81 for Imagination, .91 for Comfort, .97 for Frequency of Affect, and .97 for Tone. With the exception of Organization which falls in the range of good reliability, these ICC values all fall above Cicchetti’s .75 guideline for excellent reliability (Cicchetti, 1994).

Interrater reliability will also be calculated for the storytelling variables that were scored using the Katz (1991) scoring system, based on 20 randomly chosen subjects.

*Descriptive Statistics*
Descriptive statistics of variables are reported in Table 3 and Table 4, and discussed in the following sections. Means, standard deviations, range, skewness and kurtosis of distributions were calculated for all the interval variables. The range and distribution of scores provided information regarding variability of scores. It should be noted that skewness and kurtosis were discussed in text only when significant.

**Demographics** - Participants in the study ranged from age 5.44 to 10.23, with a mean age of 7.93 (SD = 1.45). The participants were in grades kindergarten through fourth grade, with an average grade of 2.21 (SD = 1.54). The participants were all given the Vocabulary section of the Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV), as an estimate of IQ. The participants had a mean score of 12.18 (SD = 2.47), with a range of scores from 7.00 to 17.00. The WISC-IV has a standardized mean of 10 and standard deviation of 3, thus the present sample scored above average on this measure of IQ, but did have a wide range of scores, approaching a normal distribution.

Results of the IQ were tested for grade effects. Means for each grade are presented in Table 5. A significant correlation between grade and IQ score was found, \( r(61) = .22, p < .05 \), with IQ score increasing with grade. Further examination of the data revealed that it was only when kindergarteners’ scores were compared with those participants in all other grades that a significant effect for grade was found however, \( F(1, 60) = 4.73, p < .05 \), suggesting that the kindergarteners struggled significantly more with the Vocabulary task than the participants in other grades. However, this effect was not due to the 5-year-olds included in the analyses, because when the 5-year-olds were removed from the mean IQ score for the kindergarteners, the mean actually dropped from 10.83 (SD = 2.37) to 10.67 (SD = 2.50). This evidence suggests that the grade effect for IQ found was not due to the
youngest of the kindergartners. Thus, despite the WISC-IV not being validated for 5 year olds, their data was included in analyses controlling for IQ.

**Play Ability** - Play ability was measured using the Affect in Play Scale – Brief Rating Version. Descriptive statistics of the play task variables were presented in Table 3. Imagination, Organization, Frequency of Affect, Tone and Comfort were all scored following the previously validated coding system (Sacha Cordiano, Russ & Short, 2008), using a 1 to 4 scale. The 5 means for the main scores were: Imagination 2.63 (SD = 1.17), Organization 2.41 (SD = 1.02), Comfort was 2.95 (SD = 1.06), Frequency of Affect 3.00 (SD = 1.13), and Tone, 2.96 (SD = 0.72). These results show adequate variability among the players. These results are similar to those found in the previous validation study of the APS-BR (Sacha Cordiano, 2008).

Significant skewness was found in the negative direction for Imagination. Significant kurtosis in the negative direction was found for Frequency of Affect. Imagination scores were transformed using an inverse transformation to correct the skewness. The Frequency of Affect scores were transformed using a square root transformation to correct kurtosis. Correlation analyses were done with both raw and transformed data.

**Emotion Regulation** - Descriptive statistics for Emotion Regulation scores are presented in Table 4. The mean parent report score on the Emotion Regulation Subscale were 27.90 (SD = 2.96). This mean score was similar to a previous study including school-age children (Dasari, 2000). The range of Emotion Regulation Subscale scores was 20 - 32, while the possible range was 8 - 32. This suggests that no extremely low scores were obtained and therefore, the range of scores in the present sample may be restricted. The Emotion Regulation subscale was significantly skewed in the negative direction, further
corroborating that the sample had more high scores and fewer low scores than a normal distribution. Data were transformed using a square root transformation, and results are presented below with and without the transformation.

**Creativity** - Multiple measures of creativity were used. Descriptive statistics of all three Alternate Uses Task variables (Fluency, Flexibility and Originality) are presented in Table 4. All three variables showed sufficient variability. All three mean scores were similar to those found in a previous study using school age children (Russ & Kaugars, 2001). The Flexibility score and standard deviation also closely matched a 1990 study using a school sample of first and second grade children (Russ & Grossman-McKee, 1990).

Significant skewness in the positive direction was noted for all three scales, indicating the presence of asymmetry and a greater frequency of low scores (i.e. fewer answers, fewer categories and fewer original answers). Significant kurtosis was found in the positive direction for Originality. To correct for this, all three variables were transformed using a square root correction. Correlation results are presented using both raw scores and the transformed data.

The main scores for the storytelling task using an adaptation of the Katz (1991) scoring system are displayed in Table 4. This adapted scoring system has not been used previously, so there are no previous data to determine where the present sample would lie in comparison to a normative group. Significant skewness and kurtosis, both in the positive direction, were found for the Frequency of Implied Affect distribution, suggesting more low scores and more scores in the tails of the distribution than a normal curve. Significant skewness in the positive direction was also found for the distribution of Total Affect expressed. The range of scores for Variety of Affect was 2 - 6, whereas the possible range
was 0 – 11. This suggests that no extremely high scores were obtained, and therefore, the range of scores may be restricted.

The descriptive statistics for the storytelling scores using Hennessey and Amabile’s (1988) scoring system were presented in Table 2. Two raters scored all of the stories on 4 variables: Creativity, Novelty, Imagination, and Likeability. While there are no previous studies using this exact protocol with which to compare these results, it can be noted that all four scales had means around 3.0 with standard deviations approaching 1.0, placing them in the middle of the 1 - 5 Likert scale, with adequate variability.

Preliminary analyses revealed that the two raters’ scores were highly correlated with each other (see Table 2). However, the two raters did not achieve good interrater reliability, using Cohen’s Kappa. This result indicates that while the raters agreed on their rank ordering of the stories, they did not do so using the exact same numerical scores. This is unsurprising due to the deliberate use of vague rating scales. Due to the high correlations and the lack of interrater agreement, the two raters’ scores were averaged to compute composite scores for the 4 variables for use in the remaining analyses, presented in Table 4. The composite scores also showed means around 3.0 with standard deviations of approximately 1.0, indicating little change from when the raters’ scores were analyzed separately.

**Executive Functioning** - Executive functioning was measured using two standardized scores from the Wisconsin Card Sorting Task – 64 Card Version, the number of Perseverative Responses and the number of Conceptual Level Responses. Raw scores were standardized based on age of the participant using the WCST-64 scoring manual. The descriptive statistics for these scores are presented in Table 4. The mean standard score on the Perseverative Responses scale was 114.07 (SD = 27.75). The scores for this scale are
standardized around a mean of 100, indicating that the present sample performed slightly better than an average sample. Significant kurtosis in the negative direction was found for this distribution. Data was transformed using a square root transformation, and is presented in analyses both raw and transformed. The mean standard score on the Conceptual Level Responses scale was 104.20 (SD = 17.72). The scores for this scale were also standardized around a mean of 100, indicating that the present sample performed right around average.

*Grade, Age, IQ, and Story Length*

Pearson product-moment correlations were used to determine relationships between IQ and the play, creativity, emotion regulation and executive functioning variables. The WISC-IV Vocabulary score, the measure of IQ in the present study, was not related to any of the play task variables, nor the storytelling variables of both the Katz (1991) and Hennessey and Amabile (1988) scoring systems, nor the scores of executive functioning. IQ was found to positively correlate with both the Fluency and Flexibility scores of the Alternate Uses Task and with the Emotion Regulation subscale (see Table 6). However, these correlations were small in magnitude. Analyses using these variables are presented below with and without controlling for IQ.

Age and grade were not found to relate to executive functioning or emotion regulation scores. Age and grade were found to positively relate to some measures of creativity using the Katz (1991) scoring system, as well as most of the composite scores using the Hennessey and Amabile (1988) scoring system, and creativity as measured by the Alternate Uses Task. Age and grade were also found to relate with Imagination, Organization and Tone from the play task (See Table 6). A breakdown of means and standard deviations by grade for all variables is presented in Table 7. Where grade and age were
found to correlate with variables, correlation results are presented both with and without controlling for grade. Grade was used instead of age because in most instances grade showed a stronger relationship.

Story length for the storytelling task, measured by word count, was found to correlate with all of the Katz (1991) storytelling scores and the four composite scores calculated from the Hennessey and Amabile (1988) scoring system. These correlations are presented in Table 8. Debate remains over whether the overall tendency to generate more material should be incorporated as part of the creativity construct, thus correlation analyses including these measures are presented both with and without controlling for word count.

Main Hypotheses

Pearson product-moment correlations were used to determine the relationships among the variables of play ability, creativity, emotion regulation and executive functioning.

Play Ability and Creativity - For some measures, main hypotheses were supported, as play ability was significantly correlated with creativity. Specifically, play ability measured by the Affect in Play Scale – Brief Rating was significantly related to creativity scores from both storytelling and the Alternate Uses Task. Tables 9 and 10 display the correlations between the Affect in Play Scale and the Alternate Uses Task and Storytelling Variables. The Organization score from the Affect in Play Scale positively correlated with the Alternate Uses Task Fluency score, $r(57) = .23$, $p < .05$. Children who were rated as having more organization in their play were more likely to generate more acceptable alternate uses answers.

Using transformed data to correct for skewness, the Imagination scores from the play task were positively correlated with both Fluency and Flexibility from the Alternate Uses
Task, $r(57) = .23$, $p < .05$, and $r(57) = .24$, $p < .05$, respectively. Results for the play variables of Organization, Frequency of Affect, Comfort and Tone, and their relationships with Fluency, Flexibility and Originality were unchanged.

When controlling for IQ, no significant correlations between scores on the play task and divergent thinking remained. Similarly, when controlling for IQ using the transformed data, no significant correlations between scores on the play task and scores on divergent thinking were found. Correlations controlling for IQ are also presented in Table 9 in parentheses. However, reviewing the Table, the original correlation between Organization and Fluency was small in magnitude, thus when controlling for IQ, despite the relationship not changing dramatically, it did drop below significance.

When controlling for grade, all previous significant correlations using the raw scores were no longer significant, and Tone became significantly negatively correlated with Fluency, $r(46) = -.28$, $p < .05$, suggesting that those children who showed more negative affect during play generated more acceptable answers on the divergent thinking task. Results matched those of a past study in which negative affect was found to relate with divergent thinking (Russ & Shafer, 2006).

In general, play task and storytelling task variables, using the modified Katz (1991) scoring system were found to relate (see Table 10). Imagination scores on the play task were positively correlated with the Frequency of Direct affect expressed in the storytelling, $r(55) = .27$, $p < .05$. Organization scores on the play task were positively correlated with the frequency of Direct Affect expressed, $r(55) = .33$, $p < .01$, and the Total Affect expressed, $r(55) = .24$, $p < .05$. Comfort scores from the play task were positively correlated with the Frequency of Direct Affect expressed in storytelling, $r(55) = .28$, $p < .05$. Furthermore,
Frequency of Affect scores from the play task were positively correlated with the Frequency of Direct Affect expressed, $r(55) = .26$, $p < .05$, and with the Fantasy score on the storytelling task, $r(55) = .26$, $p < .05$. Lastly, the Tone score from the play task was negatively correlated with the Fantasy score from the storytelling task, $r(57) = -.31$, $p < .05$.

Transformed data was also analyzed for correlations between play and storytelling. All correlations found using the raw data remained significant except for Organization of play and Total Affect expressed in the story. No new correlations were found. Because transforming the data had little impact on the results of the correlations, raw data were used in the analyses looking at the effects of IQ, grade and story length, presented below.

Controlling for IQ, the majority of the correlations remained the same. Frequency of Affect in the play task also no longer correlated with the Fantasy score from storytelling. When controlling for grade, four of previously found correlations remained: the amount of Direct Affect expressed in storytelling was correlated with Organization, Comfort and Frequency of Affect from the play task. Tone from the play task was negatively correlated with amount of fantasy in storytelling. All other correlations no longer met significance (see Table 10).

While controlling for story length, two new correlations developed: the correlation between Tone on the play task and Variety of Affect expressed in the storytelling became significantly negatively correlated, $p(45) = -.26$, $p < .05$, a positive correlation between Frequency of Affect on the storytelling task and Implied Affect in the storytelling, $r(45) = -.25$, $p < .05$, respectively.

In addition, scores using the Hennessey and Amabile (1988) scoring system for storytelling creativity were not found to relate to any of the play task variables, suggesting
that this scoring system was in fact different than the Katz (1991) scoring system. These results did not change when using transformed data, thus analyses below were done using raw scores.

Controlling for grade, no significant correlations between the composite storytelling scores and play ability scores were found. Controlling for story length, Comfort on the play task was found to be negatively correlated with storytelling scores of Imagination, \( r(57) = -0.28, p < .05 \), indicating that those participants who were more comfortable during the play task actually produced stories rated as less imaginative, when length of the story was taken into account.

**Play Ability and Emotion Regulation** - Parent report of emotion regulation using the Emotion Regulation subscale from the Emotion Regulation Checklist was significantly related to pretend play ability (see Table 11). Parent report on the Emotion Regulation subscale positively correlated with scores on multiple play task scales, specifically, Imagination, \( r(48) = .30, p < .05 \), and Comfort, \( r(49) = .40, p < .01 \). Thus, children who were rated as having better emotion regulation by their parents tended to display more imagination and comfort during the play task.

Correlations between play scale variables and the measure of emotion regulation were also explored using transformed data for those variables with skewed distributions. Results were the same as those found with raw data, thus analyses controlling for IQ are presented with raw scores only. When controlling for IQ, results of the analyses remained the same, such that those children rated by their parents to have better emotion regulation tended to have higher scores on Imagination when playing, and Comfort engaging in the play task. When controlling for grade, the Emotion Regulation subscale was still positively correlated
with Comfort in play, \( r(37) = .502, p < .01 \). The correlation between emotion regulation and imagination in play was no longer found to be significant.

**Play Ability and Executive Functioning** - Scores of executive functioning from the Wisconsin Card Sorting Task, 64-Card Version, were not found to relate with any other variables in the present study, shown in Table 11. Specifically with play, scores of executive functioning were not found to significantly relate to any of the scores of pretend play ability. Using transformed play task scores, there were still no correlations found with the executive functioning measures. IQ was not controlled for in these analyses because IQ did not relate to play task and executive functioning scores. Controlling for grade no significant correlations were found between play ability and executive functioning using both the raw and transformed data.

**Emotion Regulation and Executive Functioning** - Executive functioning was not found to significantly relate to emotion regulation. Since emotion regulation scores were found to be significantly correlated with IQ (presented above), analyses were also run controlling for IQ. Results remained the same; scores of executive functioning were not related to emotion regulation with IQ controlled for. These results remained when controlling for grade, and when using the transformed Emotion Regulation subscale data as well.

**Secondary Hypotheses**

**Inter-relationships between multiple measures of creativity** - Pearson product-moment correlations were used to address the hypothesis that the relationship between the multiple measures of creativity, the Alternate Uses Task and the two measures of Storytelling would be significant and positive. Descriptive statistics of these variables are presented in Table 2 and Table 4.
Scores from the Alternate Uses Task were compared with the Katz (1991) set of scores for the storytelling task. Results of these analyses are presented in Table 12. Participants who generated more alternate uses answers, tended to have stories rated as containing more affect expression, varieties of affect and fantasy elements. Flexibility scores from the Alternate Uses Task were also found to be positively correlated with affect and fantasy variables. In addition, those children who were able to generate higher numbers of original alternative uses also tended to create stories rated as having more affect, more affect categories and higher levels of fantasy.

Composite scores on the storytelling were also compared with scores on the Alternate Uses Task. Results are presented in Table 12. Results suggest that those participants who were able to generate more acceptable uses tended to be rated as telling more likeable, creative, novel and imaginative stories. In addition, participants who were able to generate alternate uses stemming from a wider range of categories, were also more likely to be rated as having told stories that were more likeable, creative, and novel. Finally, links between Originality and storytelling showed that participants who generated more original alternate uses provided stories rated as more creative and more novel. These relationships between Storytelling and Alternate Uses scores were of small effect size.

Since storytelling was scored using two separate methods, scores from the Katz (1991) scoring system for rating storytelling creativity were compared with the composite scores from the two raters who scored the stories using the Hennessey and Amabile (1988) scoring system. All scores were found to be significantly positively correlated with each other. These correlations are presented in Table 8.
**APS-BR Intercorrelations** - An intercorrelation matrix for the APS-BR is presented in Table 13. The intercorrelations from the present study were compared with those from the Sacha Cordiano (2008) study. The pattern of intercorrelations was similar to those found previously for Organization, Imagination, Comfort and Frequency of Affect. The correlations between Tone of affect expression and the other APS-BR variables differed from the results found in the 2008 study. Specifically, Tone showed a stronger relationship with Organization and Frequency of Affect in the 2008 sample than in the present study, while not correlating significantly with these scores in the present study. In addition, Imagination and Tone were not significantly related in the 2008 sample, but showed a significant positive relationship in the present study.

*Exploratory Hypotheses*

**Executive Functioning and Creativity** - Exploratory analyses were done to examine if any relationships existed between the measure of executive functioning and scores of creativity on both Alternate Uses and Storytelling. The Alternate Uses Scores were not found to have any significant relationships with the measures of executive functioning from the Wisconsin Card Sorting Task. The participants’ scores on Perseverative Responses was found to correlate with the Frequency of Direct Affect from the Katz (1991) storytelling scoring, \( r(54) = .28, p < .05 \). Therefore, those participants with better executive functioning were also found to express more affect directly in their storytelling. However, this effect was small in magnitude. No significant correlations were found between the measures of executive functioning and the composite scores on the storytelling.

**Effects of Fourth Graders** - To examine the possibility of a fourth grade slump, analyses were run excluding all participants in the fourth grade. Correlations between grade
and scores on play, divergent thinking, and emotion regulation largely remained the same, suggesting that the fourth graders were not significantly different in their performance on these tasks. The standard score for Perseverative Responses became significantly related to grade. Storytelling scores of Total Affect expressed and the composite Likeability score were no longer significantly related to grade. In addition, the Variety of Affect expressed in storytelling became significantly related to grade.

Excluding the fourth grade, correlations among play and creativity scores were explored. No significant correlations between APS-BR scores and the Alternate Uses Task were found, such that the previous correlation between Organization and Fluency was no longer significant. Furthermore, when excluding the fourth graders, all significant correlations previously found between APS-BR scores and storytelling scores using the Katz (1991) scoring system, were no longer significant, with the sole exception that Frequency of Affect in pretend was significantly correlated with Fantasy in storytelling. All correlations between APS-BR scores and storytelling scores using Hennessey and Amabile’s (1988) scoring system remained nonsignificant.

Correlations among play, emotion regulation and executive functioning were also explored after excluding the fourth grade data. All correlations between play and executive functioning remained nonsignificant, as did correlations between emotion regulation and executive functioning. Emotion regulation was still significantly correlated with Comfort on the play task, but was no longer significantly related to Imagination.

Correlations among divergent thinking scores and creativity scores were also examined removing fourth graders. No significant correlations were found between the
composite scores on storytelling and the alternate uses scores. Moreover, no significant correlations were found between the Katz (1991) scores on storytelling and alternate uses.

Discussion

The primary purpose of the present study was to test the hypotheses that pretend play would relate to creativity, emotion regulation and executive functioning. Children who are better players should be more creative and better able to self-regulate. In turn, creativity and emotion regulation should impact executive functioning through increased problem-solving and mental flexibility. The major findings from the present study were that play ability related to multiple measures of creativity as well as parent report of emotion regulation. However, executive functioning was not found to relate to play, creativity, nor emotion regulation.

Play Ability and Creativity

Some scores from children’s play ability were associated with their creativity in this sample. The relationships between play and creativity differed depending on the creativity assessment method (storytelling versus divergent thinking). In the following sections, each measure of creativity and its relationship with play ability will be presented separately.

Play Ability and Divergent Thinking - Consistent with hypotheses, higher scores on the Organization score of the play task related to higher numbers of acceptable answers on divergent thinking. Specifically, when children were viewed as better able to organize their play into integrated stories with complex plots, they were also better able to generate more acceptable uses as answers to the divergent thinking questions. This result was true for both the raw and transformed data. This relationship replicates previous research between the
APS-BR and Alternate Uses Task (Sacha Cordiano, 2008; Sacha Cordiano, Russ & Short, 2008). Using the transformed data to normalize the distributions, higher scores on Imagination on the play task related to higher numbers of acceptable answers on divergent thinking and answers stemming from more categories as well. This result also replicates findings from the Sacha Cordiano (2008) study. This is an important finding, as evidence that the relatively new APS-BR measure of pretend play is assessing the same types of variables as the original APS, since the same associations with divergent thinking are found with both measures. Nevertheless, the magnitude of the correlations was small. Although none of the play task variables were found to correlate with IQ, scores of divergent thinking were. These results did not match past data reporting divergent thinking to be relatively independent of IQ (Runco, 1991; Russ & Peterson, 1990). When controlling for IQ, the correlations between divergent thinking and play, stated above, were no longer found to be significant. Closer examination of the data show that while correlations no longer reached significance, the relationships between the play task variables and divergent thinking scores did not change dramatically when controlling for IQ, but simply crossed from being of weak significance, to being just over the .05 alpha level. This makes sense in light of the fact that IQ related to divergent thinking but did not relate to play, thus controlling for IQ should not have a strong effect on the relationship between play and divergent thinking.

This correlation between IQ and divergent thinking, regardless of play however, raises the question of whether IQ should be included as part of the construct of creativity. Those children with higher IQs may be able to generate more material, answers or solutions, no matter what the task given, thus they will always be at increased odds of producing something unique or more creative than their peers. In this regard it could be argued that it
does not make sense to eliminate verbal intelligence from the equation when measuring how creative one is capable of being.

**Play Ability and Storytelling** - Also supporting hypotheses, play task variables were found to relate to storytelling variables. Consistent with hypotheses, storytelling scores measuring Direct Affect in storytelling correlated with play task variables of Imagination, Organization, and Frequency of Affect. Specifically, children who displayed more expressions of direct affect when storytelling also tended to show more imagination, organization and affect in their play. These results are important in regards to affect expression across multiple domains. The present study showed that children who express more affect during play were also found to express more affect in storytelling. This link can be added to past research showing affect expression in play to also correlate with affect expression in memories (Russ & Shafer, 2006), supporting the notion that amount of affect expression is cross-situational.

The amount of fantasy present in children’s stories was also related to the amount of affect expressed in their play, emphasizing the theorized link between affect and creativity (Russ, 2004). When controlling for word count, this link between fantasy and amount of affect expressed was not significant, possibly suggesting that both the amount of fantasy in a story and the amount of affect in play are both products of children who simply say more in general. However, thinking developmentally, one could argue that children who are more expressive in general create the opportunity for themselves to spend more time fantasizing and expressing affect through their play and creativity. Regardless of whether these skills grow due to higher word generation in general, the results support the hypothesized link between play and creativity.
Further supporting the theory that affect is important for creative expression were exploratory analyses which found that the tone of play was negatively correlated with fantasy in storytelling, suggesting the importance of negative affect in creativity. Thus, it is not only positive emotion which can lead one to be creative, but also negative emotions which can allow the mind to make associations and expand to new, creative and novel ideas.

The amount of affect expressed directly in the storytelling was also found to be positively related with Comfort during the play task, supporting the link between the skill of engaging and enjoying pretend play and greater amounts of affect expression. This finding is important in that those children who are more comfortable engaging in play, again are providing themselves with more opportunities for creativity and experimentation with affect expression.

The fact that play variables did not relate to storytelling scores using the Hennessey and Amabile (1988) scoring system was inconsistent with a priori hypotheses, however it indicates some complexity within the construct of creativity. First, it is possible to argue that the open scoring system in which concrete criteria are not specified to the raters is too vague a system to be a reliable measure of creativity. This would be supported by the fact that the two raters of the storytelling did not achieve interrater reliability with each other in terms of exact scoring agreement. Furthermore, while Hennessey and Amabile (1988) assert that their consensus scoring system for storytelling does not rely on age-relevant skills, the present study found composite scores of Creativity, Likeability and Novelty to all be significantly correlated with age and grade.

However, the raters did have highly significant positive correlations with each other suggesting that while they did not use the same criteria for scoring, they did agree on the rank
order of the stories in terms of the four scoring scales. This result supports the notion put forth by Hennessey and Amabile (1988), that quality creativity, while difficult to define, is something which most people can recognize. If one uses correlation as a measure of reliability then, it is interesting to note that the scoring system may have been examining the creativity of the stories in a different light than the Katz (1991) scoring system. While the Katz (1991) scoring system had a heavy focus on the types of affect expressed, with a manual to follow on tallying affect units, the Hennessey and Amabile scoring system was more useful in gaining a broad picture of which stories were more appealing to the readers. For example, a story might contain a very high number of affect units, because a child repeats the same line of dialogue continually. Thus, while the Katz (1991) scoring system might find this story to be high in affect and high in fantasy (dialogue counted as information created by the participant, not present in the pictures), the Hennessey & Amabile raters would have found this story not particularly likeable, and not particularly creative, thus tapping different notions of what is creative. This concept fits with the theory proposed by Baas, De Dreu & Nijstad (2008), that creativity exists in three different domains, citing divergent thinking as an open-ended task, and storytelling as a performance task rated subjectively. However, where storytelling was scored using concrete criteria from Katz (1991), it became more of an open-ended task, while the Hennessey & Amabile (1988) scoring system left storytelling as a subjectively rated performance task. Thus, the differences in scoring may have changed what type of creativity was being assessed, therefore explaining the pattern of correlations found.

Play Ability and Emotion Regulation
Consistent with the main hypotheses, higher scores on the parent rating of emotion regulation related to higher scores on multiple aspects of play ability. Specifically, when children were viewed as better able to manage emotions as rated by their parents, they were also more comfortable engaging in the play task, and showed higher levels of imagination while playing. These correlations were medium in magnitude. The results remained significant even when controlling for IQ. This is noteworthy in that it suggests that the link between good play ability and development of emotion regulation is not better accounted for by intelligence.

The results of this study were important, in that few studies have looked at the links between emotion regulation and play when a child is asked to play alone. Results showing significant correlations, add insight to the literature that the link between emotion regulation and play ability goes beyond simple learning to regulate emotion when having to compromise with a playmate. It is likely that the actual act of playing, the pretend interactions and the safe environment for affect expression are also playing a part. The notion that skills of identifying emotions in others and correctly expressing emotions can be built up through pretend play has clinical significance as well since emotion regulation is important for positive peer relationships (Eisenberg et al., 1993; Fabes et al., 1999)

*Play Ability and Executive Functioning*

Inconsistent with the proposed hypotheses, scores of play ability were not related to scores of executive functioning. When play data was transformed to correct skewness, there were still no correlations between the play and executive functioning, so the lack of relationship was not due to the distribution of the data. When controlling for age, there were no significant relationships, however the executive functioning scores had already been
standardized using age, so this result was unsurprising. These results did not support the theory that better players would also have better executive functioning including problem-solving, set shifting and inhibition.

The fact that the measures of executive functioning and play ability did not relate, does show that pretend play ability, emotion regulation and executive functioning can be viewed as separate constructs, and thus the results of this study do help to explore these differences. For example, it could be argued that children who are able to complete the play task well are using good executive functioning (following directions, coming up with ideas and solutions that are appropriate). However, present results reveal that those children who do well on the play task do not necessarily do well on the measure of executive functioning.

One possible explanation for these findings could be that the sample of children contained quite a few fourth graders. While executive functioning is a skill that develops over time, much of the research examining executive functioning development has been carried out in younger children. For example there is research citing that children exiting preschool should have already gained the ability to persist at something they find challenging (Berk, Mann & Ogan, 2006). Of the 54 children who participated in the Wisconsin Card Sorting Task, 19 obtained almost perfect scores, achieving the highest standard score possible, thus skewing the sample somewhat substantially. Further, while engaging in pretend play may be one way to develop greater executive functioning, there are certainly other ways to learn inhibition, problem-solving and set shifting. Thus, in a sample of high functioning, intelligent, private school girls, it may be impossible to sort out, using the present information, what benefit pretend play skills could add on top of the myriad other opportunities for development provided to the present sample.
Emotion Regulation and Executive Functioning

Contrary to hypotheses, emotion regulation scores were not found to relate with measures of executive functioning. The relationship between the Emotion Regulation Checklist and the Wisconsin Card Sorting Task has not been reported previously in the literature, however, the results of this study would have been expected to replicate past studies in which others measures of executive functioning and emotion regulation were found to relate (Carlson & Wang, 2007). It is possible that the restricted range of scores for the Emotion Regulation subscale combined with the large quantity of high scores on executive functioning made it more difficult to find significant results in the present sample. The private school setting, in which children who have not achieved at least passable emotion regulation and executive functioning abilities may be asked to leave, does not create the kind of normative distribution of skills that might have been more conducive to finding a relationship between the measures.

These results also do not support the model proposed by Zelazo and Cunningham (2008) in which emotion is viewed as a motivator for problem-solving, and thus emotion regulation is always at least partially linked to executive functioning. These results do however help to establish that executive functioning and emotion regulation are separate constructs, such that emotion regulation is not simply a subcategory within the larger construct of executive functioning. Since multiple theorists continue to posit that emotion regulation and executive functioning influence each other (Bell & Wolfe, 2004; Cacioppo & Bernston, 1999; Zelazo & Cunningham, 2007), the results of the present study become important for showing that the emotion regulation and executive functioning can be measured independently; one can have high emotion regulation without having high
executive functioning, or vice versa. Replication of these findings is important before further conclusions can be drawn.

**Multiple Measures of Creativity**

A secondary purpose of the present study was to determine the relationships among the multiple methods used to assess creativity. Overall, the Alternate Uses Task was found to be a valid measure of creativity, replicating a variety of past studies (e.g. Russ & Grossman-McKee, 1990; Russ & Kaugars, 2001). Scores obtained from this sample were quite similar to scores obtained in the previous research from comparable samples, providing evidence for the reliability of the measure and suggesting that the task was reliably scored. It was expected that the scores for the task would capture three dimensions – Fluency, Flexibility, and Originality – as well as relate to other measures of creativity (i.e. storytelling). Partial support for the secondary hypothesis was obtained.

Consistent with hypotheses, scores of creativity using the Alternate Uses Task were found to be highly correlated with scores on the storytelling task, a second way of measuring the creativity construct. Specifically, those children who were able to generate more answers on the Alternate Uses Task and to draw answers from a wider variety of categories, also tended to be the same children who showed higher amounts of affect, larger varieties of affect, and greater amounts of fantasy in their stories. These children were also more likely to be rated as having stories that were more likeable, novel, creative and imaginative when scored by raters given no specific scoring criteria. In addition, those children who gave more original answers (meaning answers that made up fewer than 1% of all responses given for an item), were also the same children who tended to produce stories that contained more affect, more variety of affect, and more fantasy, and stories that tended to be rated as having higher
levels of creativity and novelty by the outside raters. The correlations between these two measures of creativity help to support the construct validity of both the Alternate Uses Task and the Storytelling Task. Further, the agreement between the two scoring systems for the storytelling task builds construct validity for the measures.

**Grade Effects**

The relationships between age and scores on pretend play, creativity, emotion regulation and executive functioning were investigated. Grade was found to positively correlate with APS-BR scores of Imagination, Organization and Tone. It is important to note that Frequency of Affect and Comfort scores were not related to grade suggesting that these abilities are relatively stable across time. Further, the positive relationship between Tone and grade suggests that older children had more positive affect in their play.

Conversely, to the affects for grade and affect on the play task, grade was found to relate to scores of Direct Affect expressed in storytelling, and the Total Affect expressed in storytelling. These results support the notion that the play task is a different kind of task than storytelling. Grade was also found to significantly relate with all three scores of divergent thinking and with Creativity and Likeability composite scores from the subjective ratings of storytelling. Grade was not found to relate to the emotion regulation, nor to the executive functioning standard scores.

The relationships among play, creativity, emotion regulation and executive functioning were investigated controlling for age. When controlling for grade, the majority of correlations originally found with the raw data were no longer significant. Most notably, play task scores of Organization and Imagination were no longer significantly related to divergent thinking scores of Fluency and Flexibility. Emotion regulation was no longer
correlated with play task scores of Imagination. Thinking developmentally, however, the theories predicting and supporting the relationships among these scores are based on skill growth over time. Thus, it makes sense that older children exhibited better skills in both play and creativity, having more experiences and therefore more associations on which to draw, when completing the tasks.

Fourth graders were removed from analyses to investigate the possibility of a fourth grade slump in which fourth graders become less creative due to an increased awareness of the pressure to act conventionally. Correlations between grade and play, divergent thinking and emotion regulation remained the same, suggesting that the fourth graders performed similarly to the other grades, such that removing their scores had little impact on the correlations. Further, storytelling scores of Total Affect and Likeability which had been significantly related to grade were no longer correlated with grade after removing the fourth grade. A review of Table 7 reveals that instead of a fourth grade slump, the fourth graders actually had higher scores than the other grades, and were thus contributing to the linear relationship between grade and storytelling, not taking away from it.

Similar results were found for the correlations among play, creativity and emotion regulation. When the fourth grade was excluded, no significant correlations between APS-BR scores and divergent thinking were found, and the correlations between APS-BR and storytelling previously reported were no longer significant, with the exception of Frequency of Affect in play and Fantasy in storytelling. Again, a review of the descriptive statistics by grade, presented in Table 7, show that instead of a fourth grade slump, the fourth grade scores are mostly elevated or at least even with lower grades’ scores. One possible explanation for these contrary results is that the excellent private school at which this study
was conducted may have resources in place to prevent such a fourth grade slump in creativity observed in a more normative sample. Of note, the Frequency of Affect in play across grades remained largely stable, adding to the evidence that amount of affect expression does not increase with age like other creativity and emotion regulation skills.

*Construct Validity of the APS-BR*

The results of this study added to the construct validity of the APS-BR, a relatively new measure. Descriptive statistics of the APS-BR scores presented in Table 3, were similar to scores reported in previous studies using the measure (Sacha Cordiano, 2008; Sacha Cordiano, Russ & Short, 2008). Scores on the APS-BR were not found to correlate with IQ, replicating the past research (Sacha Cordiano, 2008; Sacha Cordiano, Russ & Short, 2008).

The APS-BR intercorrelation matrix presented in Table 13 found generally the sample pattern as reported in the Sacha Cordiano (2008) sample, except that the Tone of affect score was not significantly related to Organization or Frequency of Affect in the present study as had been reported in the 2008 study, and Tone was significantly related to Imagination in the present study, although not related in the 2008 study.

The relationship between IQ and pretend play was also investigated, and no significant correlations between the Vocabulary subtest of the WISC-IV and any of the APS-BR scores were found. This is consistent with the previous studies using the APS-BR (Sacha Cordiano, 2008; Sacha Cordiano, Russ & Short, 2008), and contributes to the construct validity of the measure in a few ways. First, by replicating the results of past studies using the APS-BR, these results strengthen the reliability of the measure. Secondly, these results are also similar to results found using the APS, indicating that the APS-BR is measuring the same pretend play processes as the original scale. Third, since IQ should not theoretically
relate to play ability in a significant way, these nonsignificant findings strengthen the discriminant validity of the APS-BR as well.

Further adding to the validity of the measure, the Organization score from the APS was found to relate with Fluency in divergent thinking, and using transformed data, Imagination from the APS-BR was found to relate to Fluency and Flexibility from divergent thinking. These were some of the same associations found in the Sacha Cordiano (2008) study, thus replicating findings that the APS-BR measures pretend play in the same way as the APS.

The present study also found the APS-BR to relate with measures of storytelling creativity using the Katz (1991) scoring system. This result adds to the construct validity of the APS-BR in that it supports the theorized link between play and creativity. In addition, the result that the APS-BR did not correlate with storytelling scoring using the adapted Hennessey and Amabile (1988) scoring system, adds to the validity of the APS-BR as measuring pretend play in the same way as the APS, in that it replicates past findings (Russ, Robins & Christiano, 1999). Furthermore, scores from the APS-BR were also found to relate with parent report of emotion regulation. The relationship between Imagination and Comfort in play and higher levels of emotion regulation is fitting with theory that better players are better practiced for interacting and problem-solving in real life, adding to the convergent validity of the APS-BR.

Contrary to hypothesis, the APS-BR did not relate with score on executive functioning. This finding suggests that play and executive functioning are distinct constructs as discussed previously. Furthermore, since the Wisconsin Card Sorting Task was not found to relate with any of the other established and valid measures used in this study (the Emotion
Regulation Checklist, or the Alternate Uses Task), the lack of significant correlations with the APS-BR should not be viewed as a fault with the measure, but instead as a question for follow-up in future research.

Methodological Considerations

Method variance - In the present sample of children, play ability was related to creativity depending on the assessment method used. Storytelling scored using the Katz (1991) scoring system adaptations significantly related with many of the play task variables. In contrast, storytelling scored using the Amabile (1988) scoring system, and the Alternate Uses Task variables largely did not relate with play ability, even when controlling for IQ and length of the stories.

Method variance may be a possible explanation for the complex relationships between these three measures of creativity and play ability. As stated previously, the two measures of storytelling may be tapping distinct dimensions of the creativity construct. Further, the Alternate Uses Task may be asking participants to engage in a very different kind of creativity, making associations and drawing on past experiences, from storytelling in which the pictures are provided, somewhat limiting how novel and creative the plot could be relative to peers using the same pictures.

Further, children were asked to tell their stories to the examiner who then wrote out what the child had said. Because the stories had to be hand-written, examiners occasionally had to ask children to slow down, or wait before continuing with their stories. It is possible that this disruption affected the children’s stories, including the total length, how engaged they became in telling the story, or how much detail they chose to include. A better method
might have been to audiotape the children telling their stories, to be transcribed at a later time.

**Measurement Issues** - A statistical issue may have been decreased power. As described previously, results of power analyses indicated that a sample of 64 participants was needed to detect the predicted correlation analyses with a medium effect size. The total sample for the present study included 61 participants. However, due to missing data for the play task, emotion regulation checklist, alternate uses task, Wisconsin Card Sorting Task, divergent thinking task and storytelling task, fewer participants were included in each of the correlation analyses, which may have decreased the probability of detecting the predicted effect. In addition, the majority of correlations found were of small magnitude, further decreasing the power.

The percentage of nonplayers in the sample of children (13%) was a higher percentage than the 8% which has been found in previous research (Russ, 2004). Nonplayers were counted as children who either refused to complete the play task or discontinued the task after being unable to play for the first two minutes. While children who did not wish to engage in the task were not given scores, those participants who discontinued the task after the first two minutes were given the lowest scores, scores of 1, for Imagination, Organization, Frequency of Affect and Comfort, and no score for Tone because if the child expresses no affect, a score of how positive or negative the affect was is not applicable. Thus, this higher percentage of nonplayers decreased the number of participants whose scores were included in the play analyses, especially for the Tone score.

In addition, participants in this study were from a wide age range. First, five-year-old participants were included in the study despite two of the measures being validated only for
children who are over 6 years old. As stated previously, children who did not perform well on the WCST-64 measure were excluded since the measure is only validated for children 6 and up. Moreover, 5-year-olds were administered the Vocabulary section of the WISC-IV, and while their data was included in analyses because they actually performed better than their six-year-old kindergarten peers, this measure is also only validated for children over 6 years old.

Second, 19 of the 61 participants were from fourth grade. Current research examining creativity, posits the idea of a fourth grade slump. While the present study did not find a fourth grade slump, and it fact found fourth graders to have higher scores on a variety of measures, the marked decrease in significant correlations when fourth graders were removed from the analyses raises the possibility that fourth graders are in fact different in some way.

Limitations

There were several limitations in the present study. First, the generalizability of the results was limited to female children, who had all passed admissions tests to attend a prestigious private school. Results cannot be generalized to male children and may not apply to low income, at-risk, or clinical samples of children. In addition, the statistical power of data analyses may have been limited due to missing data for each of the measures.

While a good number of the hypothesized relationships between play and theoretically relevant measures of creativity and emotion regulation were supported, it should be noted that these correlations were relatively small in magnitude. While still significant, most of the correlations fell within Cohen’s (1992) guidelines for small effect sizes, and only a few were considered medium effect sizes. However, there are several factors to consider...
when examining the magnitude of these correlations. The APS-BR is still a very new measure for assessing pretend play, and further studies to determine possible revisions may make it a more sensitive measure. Secondly, the APS-BR is meant to serve as a way to capture play ability ‘live’ without video-tape, and thus cannot be as sensitive as the original APS in which one may watch a video tape repeatedly, and even transcribe a play session if necessary. Finally, small correlations indicate that a large amount of the variance in the relationships between play, creativity, emotion regulation and executive functioning is still unaccounted for. This speaks to the undeniably vast realm of skills, tasks and definitions which can fall under play, creativity or emotion regulation and leaves much room for future studies to help clarify the connections between these variables.

Future Directions

The results of this present study open up a variety of directions for future research. This study worked to strengthen the construct validity of the APS-BR, as an important step in replicating past findings using the measure, and examining its relationship with emotion regulation, storytelling and executive functioning for the first time. An important next step in the construct validity of the APS-BR would be to continue to explore its relationships with other theoretically related variables. Future research could work to clarify the relationships between play and different forms of creativity.

In addition, it would be valuable to more closely examine the specifics of the relationship between pretend play and emotion regulation. Evidence that emotion regulation ability could benefit from pretend play is something that can benefit both normative and clinical samples in the future. Having found a link between comfort and imagination in play
and an overall scale of emotion regulation, future research might look to more specific areas within the emotion regulation construct.

The results of the study also presented specific research questions that could be explored further regarding the surprising lack of correlations among the APS-BR scores and scales of executive functioning. Future research replicating these findings in perhaps more heterogeneous samples would be helpful in understanding why the theoretical link was not found in the present sample. In addition, it might be helpful to use the APS, original version, which may be more sensitive in some regards, such as frequency and variety of affect, to corroborate this nonsignificant finding. If play ability is truly not related to executive functioning, this information is important for both the discriminant validity of the APS-BR and executive functioning. Moreover, such information holds significant clinical relevance.

Similarly, the results of the present study raise the question of how emotion regulation and executive functioning relate to each other, if not through the correlation of two well-known and thoroughly validated measures like the Wisconsin Card Sorting Task and the Emotion Regulation Checklist. Future research could look at more complex analyses between these constructs, to further clarify the links between them. Other scores from the Wisconsin Card Sorting Task, or other executive functioning measures designed for children, might be explored. Again, research in a more heterogeneous group might add more information as to the nature of this seemingly complex relationship.

Most importantly, the results of this study are promising with regards to using play as a tool for building other important skills for children. The results of this study corroborate past evidence and theories that play abilities are important for multiple forms of creativity and emotion regulation. This study can be used as additional support for work in the field
aimed at enhancing children’s play skills in the hope of also boosting creativity, divergent thinking, problem-solving, emotional control, and positive interpersonal relationships.
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<th>Assessment Measure</th>
<th>Scoring System</th>
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Table 2. Descriptive Statistics and Correlations between Rater 1 and Rater 2 on Storytelling Task Scores

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<th>Variable</th>
<th>Rater 1</th>
<th>Rater 2</th>
<th>Correlation</th>
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<td>SD</td>
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<td>3.02</td>
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<td>3.00</td>
</tr>
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<td>1.32</td>
<td>2.68</td>
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<td>3.16</td>
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N = 57
*p<.01
Table 3. Descriptive Statistics of Affect in Play Scale – Brief Rating (APS-BR) Variables

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<td>Organization&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.41</td>
<td>1.02</td>
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<td>1.17</td>
<td>1 – 4</td>
</tr>
<tr>
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<td>1.13</td>
<td>1 – 4</td>
</tr>
<tr>
<td>Tone&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.96</td>
<td>0.72</td>
<td>1 – 4</td>
</tr>
<tr>
<td>Comfort&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.95</td>
<td>1.06</td>
<td>1 – 4</td>
</tr>
</tbody>
</table>

<sup>a</sup>n = 59; <sup>b</sup>n = 51, where a Tone score cannot be assigned to those participants who display no affect during the play task.
Table 4. Descriptive Statistics of Emotion Regulation, Divergent Thinking, Executive Functioning and Storytelling

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<th>SD</th>
<th>Range</th>
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<td>ER subscale</td>
<td>27.90</td>
<td>2.96</td>
<td>20.0 – 32.0</td>
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<tr>
<td>Divergent Thinking(^b)</td>
<td>Fluency</td>
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<td>6.81</td>
<td>4.0 – 35.0</td>
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<tr>
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<td>Flexibility</td>
<td>14.03</td>
<td>5.53</td>
<td>4.0 – 30.0</td>
</tr>
<tr>
<td></td>
<td>Originality</td>
<td>3.12</td>
<td>3.64</td>
<td>0.0 – 16.0</td>
</tr>
<tr>
<td>Executive Functioning(^c)</td>
<td>Perseverative Responses</td>
<td>114.07</td>
<td>27.75</td>
<td>55 – 145</td>
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<td>Conceptual Level Responses</td>
<td>104.20</td>
<td>17.72</td>
<td>74 – 141</td>
</tr>
<tr>
<td>Storytelling (Katz, 1991)(^d)</td>
<td>Direct Affect</td>
<td>3.82</td>
<td>2.84</td>
<td>0 – 12</td>
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<td>Implied Affect</td>
<td>8.26</td>
<td>3.35</td>
<td>2 – 19</td>
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<td>12.09</td>
<td>5.03</td>
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<td>0.76</td>
<td>1 – 3</td>
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<tr>
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<td>1.00</td>
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<td>0.93</td>
<td>1 – 5</td>
</tr>
<tr>
<td></td>
<td>Likeability</td>
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<td>0.89</td>
<td>1.5 – 5</td>
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\(^a\)n = 49; \(^b\)n = 59; \(^c\)n = 54; \(^d\)n=57
Table 5. WISC-IV Vocabulary Scores by Grade

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<th>SD</th>
<th>Range</th>
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<td>12.00</td>
<td>2.86</td>
<td>7.00 – 16.00</td>
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<td>Second grade</td>
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<td>12.67</td>
<td>2.12</td>
<td>10.00 – 15.00</td>
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<td>13.40</td>
<td>2.59</td>
<td>10.00 – 17.00</td>
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<td>Fourth grade</td>
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N = 61
Table 6. Correlations between Major Variables and IQ, Age and Grade

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<th>Age</th>
<th>Grade</th>
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<td>.43**</td>
<td>.41**</td>
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<td>Organization</td>
<td>.17</td>
<td>.32*</td>
<td>.31*</td>
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<td>.16</td>
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<td>.28*</td>
<td>.28*</td>
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<td>Comfort</td>
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<td>ER Subscale</td>
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<td>.26</td>
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<tr>
<td>WCST-64(^c)</td>
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<td>-.10</td>
<td>-.13</td>
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<td>Conceptual Level Resp.</td>
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<td>-.04</td>
<td>-.03</td>
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<tr>
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<td>.31*</td>
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<td>Fantasy</td>
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<td>.09</td>
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<td>.32*</td>
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\(^a\)n = 59; \(^b\)n = 49; \(^c\)n = 54; \(^d\)n = 57; \(^e\)n = 51
*p<.05; **p<.01
Table 7. Descriptive Statistics by Grade for Variables of Play, Creativity, Emotion Regulation and Executive Functioning

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<th>4th</th>
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</table>

Table 7 continued on following page

APS - Affect in Play Scale, Brief Rating; ERC – Emotion Regulation Checklist; WCST – Wisconsin Card Sorting Task, 64-Card Version; AUT – Alternate Uses Task
Table 7 continued. Descriptive Statistics by Grade for Variables of Play, Creativity, Emotion Regulation and Executive Functioning

<table>
<thead>
<tr>
<th>Variable</th>
<th>K</th>
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<td>10</td>
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<td></td>
<td>(SD)</td>
<td>0.86</td>
<td>0.97</td>
<td>0.77</td>
<td>1.06</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>10</td>
<td>10</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

AUT – Alternate Uses Test; ST – Storytelling
Table 8. Pearson Product-Moment Correlations among Storytelling Variables and Word Count

<table>
<thead>
<tr>
<th>Storytelling Variables</th>
<th>Composite Storytelling Variables</th>
<th>Word Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Creativity</td>
<td>Likeability</td>
</tr>
<tr>
<td>Direct Affect</td>
<td>.55**</td>
<td>.51**</td>
</tr>
<tr>
<td>Implied Affect</td>
<td>.59**</td>
<td>.58**</td>
</tr>
<tr>
<td>Total Affect</td>
<td>.70**</td>
<td>.68**</td>
</tr>
<tr>
<td>Affect Variety</td>
<td>.53**</td>
<td>.48**</td>
</tr>
<tr>
<td>Fantasy</td>
<td>.51**</td>
<td>.55**</td>
</tr>
<tr>
<td>Creativity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likeability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Novelty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imagination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>**p&lt;.01</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 9. Pearson-Product Moment Correlations among APS-BR Variables and Alternate Uses Task Variables

<table>
<thead>
<tr>
<th>Affect in Play Scale Variables</th>
<th>Alternate Uses Task Variables</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flueney</td>
<td>Flexibility</td>
<td>Originality</td>
<td></td>
</tr>
<tr>
<td>Organization(^a)</td>
<td>.23*(.16)(^c)</td>
<td>.21(.13)</td>
<td>.16(.09)</td>
<td></td>
</tr>
<tr>
<td>Imagination(^a)</td>
<td>.21(.16)</td>
<td>.21(.16)</td>
<td>.15(.08)</td>
<td></td>
</tr>
<tr>
<td>Frequency of Affect(^a)</td>
<td>.04(-.11)</td>
<td>.04(-.12)</td>
<td>.04(-.10)</td>
<td></td>
</tr>
<tr>
<td>Tone(^b)</td>
<td>-.12(-.13)</td>
<td>-.09(-.09)</td>
<td>-.13(-.13)</td>
<td></td>
</tr>
<tr>
<td>Comfort(^a)</td>
<td>.11(.08)</td>
<td>.13(.10)</td>
<td>.14(.07)</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) n = 57  \(^b\) n = 49  \(^c\) partial correlations (controlling for verbal intelligence) in parentheses  \(*p<.05*)
Table 10. Pearson Product-Moment Correlations among APS-BR and Storytelling Variables

<table>
<thead>
<tr>
<th>Storytelling</th>
<th>Affect in Play Scale Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Organization</td>
</tr>
<tr>
<td>Direct Affect</td>
<td>.33**(.31*)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Implied Affect</td>
<td>.08(.00)</td>
</tr>
<tr>
<td>Total Affect</td>
<td>.24*(.17)</td>
</tr>
<tr>
<td>Variety of Affect</td>
<td>.19(.16)</td>
</tr>
<tr>
<td>Fantasy</td>
<td>.10(-.04)</td>
</tr>
<tr>
<td>Creativity</td>
<td>.21(.05)</td>
</tr>
<tr>
<td>Novelty</td>
<td>.19(.07)</td>
</tr>
<tr>
<td>Imagination</td>
<td>.14(-.02)</td>
</tr>
<tr>
<td>Likeability</td>
<td>.12(-.06)</td>
</tr>
</tbody>
</table>

N = 55
*<sup>p</sup>< .05
**<sup>p</sup>< .01

<sup>a</sup>partial correlations (controlling for grade) in parentheses
<sup>b</sup>n = 48, where a Tone score cannot be assigned to those participants who display no affect during the play task.
Table 11. Pearson-Product Moment Correlations among APS-BR Scores, Emotion Regulation and Executive Functioning

<table>
<thead>
<tr>
<th>Variables</th>
<th>Organization</th>
<th>Imagination</th>
<th>Frequency Of Affect</th>
<th>Comfort</th>
<th>Tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotion Regulation(^a)</td>
<td>.15</td>
<td>.30(^*)</td>
<td>.23</td>
<td>.40(^**)</td>
<td>.07</td>
</tr>
<tr>
<td>Perseverative Responses(^b)</td>
<td>-.16</td>
<td>-.06</td>
<td>-.17</td>
<td>-.16</td>
<td>-.11</td>
</tr>
<tr>
<td>Conceptual Level Responses</td>
<td>-.06</td>
<td>-.01</td>
<td>-.13</td>
<td>-.07</td>
<td>-.13</td>
</tr>
</tbody>
</table>

\(^a\) n = 48
\(^b\) n = 52
\(^*\) p<.05
\(^**\) p<.01
Table 12. Pearson Product-Moment Correlations among Alternate Uses Task Variables and Storytelling Scores

<table>
<thead>
<tr>
<th>Storytelling Variables</th>
<th>Alternate Uses Task Variables</th>
<th>Fluency</th>
<th>Flexibility</th>
<th>Originality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Affect</td>
<td></td>
<td>.20</td>
<td>.18</td>
<td>.19</td>
</tr>
<tr>
<td>Implied Affect</td>
<td></td>
<td>.27*</td>
<td>.26*</td>
<td>.24*</td>
</tr>
<tr>
<td>Total Affect</td>
<td></td>
<td>.29*</td>
<td>.27*</td>
<td>.26*</td>
</tr>
<tr>
<td>Variety of Affect</td>
<td></td>
<td>.38**</td>
<td>.31**</td>
<td>.33**</td>
</tr>
<tr>
<td>Fantasy</td>
<td></td>
<td>.26*</td>
<td>.25*</td>
<td>.34**</td>
</tr>
<tr>
<td>Composite Imagination</td>
<td></td>
<td>.23*</td>
<td>.22</td>
<td>.21</td>
</tr>
<tr>
<td>Composite Novelty</td>
<td></td>
<td>.32**</td>
<td>.31*</td>
<td>.23*</td>
</tr>
<tr>
<td>Composite Likeability</td>
<td></td>
<td>.30*</td>
<td>.29*</td>
<td>.16</td>
</tr>
<tr>
<td>Composite Creativity</td>
<td></td>
<td>.37**</td>
<td>.36**</td>
<td>.25*</td>
</tr>
</tbody>
</table>

N = 57
*p<.05; **p<.01
Table 13. Intercorrelations among APS-BR Variables

<table>
<thead>
<tr>
<th>Affect in Play Scale Variables</th>
<th>Organization</th>
<th>Imagination</th>
<th>Frequency of Affect</th>
<th>Comfort</th>
<th>Tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.00</td>
<td>.72**</td>
<td>.58**</td>
<td>.64**</td>
<td>.22</td>
</tr>
<tr>
<td>Imagination&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.00</td>
<td>.65**</td>
<td>.67**</td>
<td>.34**</td>
<td></td>
</tr>
<tr>
<td>Frequency of Affect&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.00</td>
<td>.70**</td>
<td>-.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfort&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
<td>.21</td>
</tr>
<tr>
<td>Tone&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>

<sup>a</sup>n = 59
<sup>b</sup>n = 51

** p<.01
Appendix A. Measures

Scoring Manual for the Affect in Play Scale – Brief Rating

The Affect in Play Scale – Brief Rating (APS-BR) consists of a standardized play task and a criterion-based rating scale. The APS-BR is appropriate for children 6 – 10 years of age, which includes children in grades one through three.

The APS-BR measures the amount and tone of affect expression in children’s pretend play. The scale also rates the amount and quality of organization, imagination, and comfort in the child’s play. Play sessions are five minute standardized puppet play periods. The rating is done by the observer during the five minute task. Timing should be discreet, and a stopwatch should not be used.

**The APS-BR Play Task**

The play task consists of two human puppets, one boy and one girl, and three small blocks that are laid out on a table. The puppets have neutral facial expressions. Both Caucasian and African-American puppets are used, depending upon the child population. The blocks are brightly colored and of different shapes. The props and instructions are unstructured enough so that individual differences in play can emerge. The task is administered individually to the child. The instructions for the task are:

I’m here to learn about how children play. I have here two puppets and would like you to play with them any way you like for five minutes. For example, you can have the puppets do something together. I also have some blocks that you can use. Be sure to have the puppets talk out loud. The video camera will be on so that I can remember what you say and do. I’ll tell you when to stop.

Go ahead, put the puppets on, and start.
The child is told when there is one minute left with the instruction, “You have one minute left.”

**Prompts and Special Circumstances**

1. If the child does not know to put on the puppets, tell the child to put them on. Let the child know when she can start and start timing from that point.

2. If the child does not start to play, prompt the child after 30 seconds by saying, “Go ahead, have the puppets do something together.” Two prompts of this sort can be given. After two minutes of no play, the task should be discontinued.

3. If the child plays but does not have the puppets talk, prompt with, “Have the puppets talk out loud so I can hear” after 30 seconds. Two prompts can be given, space about one minute apart.

4. If a child has been playing, but then stops before time is up, prompt with “You still have time left, keep on playing.” Prompt a second time if needed with “Keep on playing, I’ll tell you when to stop.” Most children who already played will be able to continue with prompts. If they cannot, then discontinue after two minutes of no play.

5. Be sure not to give any verbal reinforcement during the child’s play. It is important however to be attentive and watch the child and be interested. After the child has finished, say “That was good” or “That was fine.”

6. If you cannot hear something the child said, it is appropriate to ask the child to repeat it and speak louder. It is fine to do this occasionally, but do not repeatedly ask the child to repeat or speak louder.

7. Be sure to stop after five minutes. A wristwatch with a second hand is adequate. Time in an unobtrusive manner.
**The APS-BR Rating Scale**

As you are watching the 5-minute taped session, rate the child on Organization, Imagination, Comfort, Frequency of Affect Expression, and Positive/Negative Tone of Affect Expression. Make sure to confine the scoring to the pretend play between the puppets. Verbalizations by the child not relating to the play are not scored. You may find it helpful to keep a written dialogue of the child’s play. You also want to keep track of the general plot of the play, including transformations, new characters, and events.

**ORGANIZATION:**

*Measuring the quality of the plot and story complexity. The rating categories are not “all-or-none” categories. For example, a child does not have to have all aspects of a 3, if one aspect is particularly salient. One aspect can compensate for deficiencies in other aspects.*

**4-POINT LIKERT SCALE**

1 – Series of unrelated events, no cause-effect; disjointed; story is very simple

2 – Some cause-effect; series of somewhat related events organized; story is somewhat simple

3 – More cause-effect; related events resembling an integrated plot; story is somewhat complex

4 – Integrated plot with beginning, middle, and end; story is complex

**EXAMPLES:**

1 – Events are completely scattered, story jumps around from event to event without any continuity or similarity between events or any continuing storyline (could be either no real events occurring, or events that have no linkage, and are completely unrelated)
2 – Events are a little less scattered, may be periods of connected events, but still no overarching plot or storyline that is consistent throughout (could be sets of events that have consistency within each other, but are not joined together as a whole – i.e., puppets get in a fight, then build something with blocks, then do something else…)

3 – Events are joined into a somewhat consistent storyline, with a more structured plot and events that would flow naturally (could be events within the context of a day, but not extremely detailed or completely structured – i.e. puppets go to school, come home, play together, build something with blocks…)

4 – Events are very detailed and all interconnected within a highly structured plot that is consistent throughout (could be puppets get up, eat breakfast, go to school, eat lunch, go to one puppet’s house, play with blocks, eat dinner, have a fight, make up, go home, go to bed)

**IMAGINATION:**
Measures the novelty and uniqueness of the play and the ability to use pretend and fantasy; imagination indicates the ability to use the blocks and/or puppets to pretend with them, to make up stories, and to create novel events; transformations involve pretending that the block is something else. *The rater is encouraged to keep track of the number of transformations, although an exact count is not necessary. The rating categories are not “all-or-none” categories. For example, a child does not need to have all aspects of a 3, if one particular aspect is especially salient. One aspect can compensate for deficiencies in other aspects.*

**4-POINT LIKERT SCALE**
1 – No make-believe, transformations, or fantasy, or only one of these, without the context of a story

2 – Several transformations, with some fantasy and pretend events, but no novel events; some variety

3 – Many transformations, variety of events, but few novel events; some fantasy and pretend events or addition of other characters

4 – Many transformations, many novel fantasy events, addition of other characters or unusual twists

EXAMPLES:

1 – Child is not really doing anything with the puppets or blocks, there is little verbalization, puppets have very simple conversations with each other and do not build anything with the blocks, or blocks are used without description of what is being built

2 – Puppets build simple things with the blocks (i.e. house, tower, table) and have a little more detail in their conversations (could be puppets are pretending to play house, or going to school), a little bit of variety in the events or transformations, but nothing especially different or unique.

3 – Puppets build many things with the blocks, and a wide variety of things, some of which may be a little different or unique, puppets may add some (not many) other events or objects to the story (i.e. both puppets having a conversation with their mother, who is not really there, pretending to pick flowers that are not really there)
4 – Puppets build many unique and different things using the blocks (i.e. computer, spaceship, telescope, swing set, car) with a wide variety of transformations and events, other characters or objects are introduced into the story, and unusual or different twists are present (i.e. going in a spaceship, flying, etc…)

**COMFORT:**

Global rating for overall comfort in playing; lower end rates comfort (ability to play), while higher end indicates comfort and enjoyment (immersion in play).

**4-POINT LIKERT SCALE**

1 – Reticent, distressed; stops and starts

2 – Some stiffness; not enjoying or involved in play

3 – OK, but not completely involved or enjoying; continues to play

4 – Comfortable, involved, and enjoying play

**EXAMPLES:**

1 – Child cannot really “get into” the play, may look to examiner or express that he/she doesn’t know what to do, child seems not to want to play or expresses that he/she doesn’t want to play, once child begins playing, he/she stops frequently and cannot pick back up easily, session may be discontinued because of child’s inability to play continuously

2 – Child may take time to “get into” the play and seem hesitant or reluctant to play, may look to examiner for encouragement or instruction, child eventually begins to play but may stop from time to time, child is able to continue or “get back into” the play, but is not enjoying or involved in the play, may ask how much time is left or express that he/she doesn’t know what to do
3 – Child may take a little time to get started, but once started, child continues to play, child is somewhat involved and enjoying the play, once he/she gets started, he/she doesn’t stop often or need encouragement or instruction from the examiner, child’s affect and tone of voice indicate some level of involvement or enjoyment in the play, even though child is not completely immersed.

4 – Child is eager and enthusiastic to play, is able to “jump right in” and continue playing throughout the session, child does not need encouragement or instruction from the examiner, and tone of voice and affect indicate the child is completely immersed in and enjoying the play

**FREQUENCY OF AFFECT EXPRESSION:**

Measures the frequency of affective expression. The rater should attempt to tally each unit of affect expression. The tally should be an estimation, so as not to extract from the other rating. A unit of affect expression is defined as one scorable expression by an individual puppet. In a two-puppet dialogue, expressions of each puppet are scored separately. A unit can be an expression of an affect state (e.g. “This is fun”) an affect theme (e.g. “Here is a bomb that is going to explode.”) or non-verbal (e.g. one puppet punching the other). If non-verbal activity, such as fighting, occurs in a continuous fashion, a new unit is scored about every five seconds (timing should be discreet – no stopwatch is necessary).

**AFFECT CATEGORIES**

*Aggression:* Expression of anger; fighting, destruction, or harm to another character or object; reference to destructive objects (guns, knives) or actions (breaking).
**Nurturance/Affection:** Expressions of empathy or sympathy with another character; affection; helping and support.

**Happiness/Pleasure:** Expression of positive affect that denotes pleasure, happiness, having a good time, enjoyment, and contentedness.

**Anxiety/Fear:** Expressions of fear and anxiety. Content such as school anxiety, doctor visits, fears, concern about punishment, and worry. Actions of fleeing and hiding, or agitation.

**Sadness/Hurt:** Expressions of illness, physical injury, pain, sadness, loneliness.

**Frustration/Disappointment/Dislike:** Expressions of disappointment and frustration with activities, objects, and limitations.

**Competition:** Expressions of wanting to win, competitive game-playing, pride in achievement, and striving for achievement.

**Oral:** Expressions of oral content of food, cooking, eating and drinking. Affect expressions are positive about oral content.

**Oral Aggression:** Expressions of oral aggressive themes such as biting or food that has negative affect associated with it.

**Anal:** Expression of anal content including dirt and making a mess.

**Sexual:** Expressions of sexual content.

**4 POINT LIKERT SCALE**

1 – Low (0 – 2 affect units present)

2 – Mild (<8 affect units present)

3 – Moderate (8 – 15 affect units present)

4 – High (>15 affect units present)
TONE OF AFFECT EXPRESSION:

Measures overall tone of affect in the story, based on the average amount of positive or negative affect expression in the affect units in the child’s play. If there is no affect present, do not give the child a score for this category.

4-POINT LIKERT SCALE

1 – Predominately negative affect dominates the play; overall negative tone to play and negative affect units

2 – Somewhat negative affect dominates the play; there is a mix of negative and positive affect units, but there is a generally negative affect tone to the play

3 – Somewhat positive affect dominates the play; there is a mix of positive and negative affect units, but there is a generally positive affect tone to the play.

4 – Predominately positive affect dominates the play; overall positive tone to play and positive affect units.

EXAMPLES:

1 – Almost all of the affect revolves around events that are sad, frustrating, disappointing, or upsetting; puppets are predominately angry, aggressive, and upset; fighting, crying or anger is present

2 – Most of the affect revolves around negative events, but there are some positive events mixed in; the negative events dominate the story, and fighting or other aggression may occur; the story may end on a negative note

3 – Most of the affect revolves around positive events, but there are some negative events mixed in; the positive events dominate the story, and affection or other happy events may occur; the story may end on a positive note
4 – Almost all of the affect revolves around events that are happy, affectionate, pleasurable, enjoyable, or fun; puppets are predominately happy, affectionate, and having a good time; physical affection, verbal praise, or evidence of enjoyment is present.
<table>
<thead>
<tr>
<th>My child…:</th>
<th>Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is a cheerful child.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Exhibits wide mood swings (child’s emotional state is difficult to anticipate because s/he moves quickly from positive to negative moods).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Responds positively to neutral or friendly overtures by adults.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Transitions well from one activity to another; does not become anxious, angry, distressed or overly excited when moving from one activity to another.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Can recover quickly from episodes of upset or distress (for example, does not pout or remain sullen, anxious, or sad after emotionally distressing events.)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. Is easily frustrated.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. Responds positively to neutral or friendly overtures by peers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. Is prone to angry outbursts / tantrums easily.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. Is ably to delay gratification.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. Takes pleasure in the distress of others (e.g. laughs when another person gets hurt or punished; enjoys teasing others).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. Can modulate excitement in emotionally arousing situations (e.g. does not get ‘carried away’ in high-energy play situations, or overly excited in inappropriate contexts).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>My child…:</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
<td>Almost Always</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------</td>
<td>-----------</td>
<td>-------</td>
<td>---------------</td>
</tr>
<tr>
<td>12. Is whiny or clingy with adults.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13. Is prone to disruptive outbursts of energy and exuberance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14. Responds angrily to limit-setting by adults.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15. Can say when s/he is feeling sad, angry or mad, fearful or afraid.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16. Seems sad or listless.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17. Is overly exuberant when attempting to engage others in play.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18. Displays flat affect (expression is vacant and inexpressive: child seems emotionally distant).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19. Responds negatively to neutral or friendly overtures by peers (e.g. may speak in an angry tone of voice or respond fearfully).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20. Is impulsive.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21. Is empathic towards others; shows concern when others are upset or distressed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>22. Displays exuberance that others find intrusive or disrupting.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>23. Displays appropriate negative emotions (anger, fear, frustration, distress) in response to hostile, aggressive, or intrusive acts by peers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>24. Display negative emotions when attempting to engage others in play.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Alternate Uses Test

Instructions

Now, I am going to name an object, any kind of object, like a light bulb, and it will be your job to tell me all the different ways that the object could be used. Any object can be used in a lot of different ways. For example, think about string. What are some of the ways you might use string? (child tries). Yes, those are fine. You can also use string to attach a fish hook, to jump rope, to sew with, to hang clothes on, and to pull shades. There are lots more too and yours were good examples. Now I’m going to name different objects and I want you to tell me all the different ways you could use the object that I name. Newspaper – All the different ways you can use a newspaper. (Prompt on the first two – Can you think of anything else?)

Additional Administration

Rules

Alternate Uses Test

1. Prompt only on items one and two. Prompt is ‘can you think of anything else.’
   Prompt after child indicates “that’s all” or if a 1’ silence passes.
2. On item one, if child doesn’t start after 1’, prompt with “all the different ways you can use a newspaper.”
3. On final 4 items, end after 1’ silence and move into next item, making sure the child is done.
4. Probe. Only if you are not clear on the meaning of the response. Do not probe in order to make more specific (i.e. – game – “what kind of game” – do not probe in this way.)

Objects

1. Newspaper
2. Button
3. Key
4. Shoe
5. Automobile Tire
6. Knife
Adaptation of Katz (1991) Storytelling Scoring

Participant # __________

<table>
<thead>
<tr>
<th>Variety of Affect</th>
<th>Direct</th>
<th>Implied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Happiness/Pleasure</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>2. Aggression/Anger</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>3. Competition</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>4. Affection</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>5. Oral</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>6. Oral Aggression</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>7. Anxiety/Fear</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>8. Sadness/Hurt</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>9. Sexual</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>10. Anal</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>11. Frustration</td>
<td>______</td>
<td>______</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency of Affect</th>
<th>Totals</th>
<th>______</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>______</td>
<td>______</td>
<td>---</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grand Total Affect</th>
<th>______</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Fantasy</th>
<th>______</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = No Fantasy</td>
<td>2 = Some Fantasy</td>
</tr>
</tbody>
</table>
Adapted Hennessey & Amabile (1988) Storytelling Scoring

Dear Rater,

Thank you for taking the time to help score these stories. For each story, please read the story completely and then fill out a scoring sheet. Remember to put the story/participant number on each scoring sheet. There are 4 scales, each going from 1 to 5, measuring the creativity, imagination, novelty of ideas, and likeability of the child’s story. Please just circle the appropriate numbers to score.

The scales have purposely been left somewhat ambiguous, so that each scorer may interpret the criteria to mean whatever he or she thinks is the most appropriate or important. You are not meant to take a long time in considering scores after reading each story. Please do not try to think of outside, concrete anchor points for scoring, but instead score the stories relative to each other.

I have included photocopies of the pages of the storybook that the children are describing, if you wish to follow along with a visual aid. This might help you decide which stories make sense or are more imaginative.

Thank you again,

Jessica Dillon
Participant # ___________________

**Creativity of the Story**

1  2  3  4  5  
Low Creativity  
High Creativity

**Imagination Demonstrated by Storyteller**

1  2  3  4  5  
Low Imagination  
High Imagination

**Novelty of the Ideas**

1  2  3  4  5  
Low Novelty  
High Novelty

**Degree to which You Liked the Story**

1  2  3  4  5  
Low Likeability  
High Likeability


frontal-lobe function in schizophrenia and in chronic alcoholism. *Psychiatry Research, 46*, 175-199.


