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Pretend Play and Creativity in Preschool-Aged Children: Associations and Brief Intervention

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PRETEND PLAY AND CREATIVITY IN PRESCHOOL-AGED CHILDREN:

ASSOCIATIONS AND BRIEF INTERVENTION

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Preliminary baseline correlational analyses were reported at the annual meeting of the Society for Personality Assessment in Chicago, IL, March 2012, and final data was presented at the annual American Psychological Association meeting in Washington, D.C., August 2014. The data in this article was also reported in the doctoral dissertation of Karla K. Fehr at Case Western Reserve University. We would like to acknowledge psychology graduate students Claire Borgschulte and Kelly Christian, and undergraduate research assistants John Wigal, Kellie Willis, Sarah Thompson, and Ahra Cho, for their assistance collecting and scoring data.

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Abstract

Cognitive and affective processes in play have related to measures of creativity in school-aged children. In a previous examination of these play processes in preschool-aged children with the Affect in Play Scale-Preschool version, cognitive and affective play processes related to divergent thinking. One goal of the current study was to replicate this finding and examine the relationship between pretend play and storytelling creativity in preschoolers. A second goal was to test the effectiveness of a brief play intervention. Adult-led play interventions have effectively improved play skills and related developmental skills for children with documented play deficits. However, there is a need for an empirically-based, brief play intervention for typically developing preschool-aged children. A pilot study found medium to large effect sizes for increased play skills for an intervention with preschool-aged children and their parents. The current study aimed to examine the effectiveness of the intervention without parent involvement.

Forty-one typically developing children (ages 4-6 years) participated. Pretend play, divergent thinking, and creative storytelling were assessed at baseline and outcome. Children were randomly assigned to the play skills intervention, which received three 20-30 minute individual play sessions, or the active control. At baseline, results were that cognitive and affective play processes related to divergent thinking and creative storytelling. The play intervention did not significantly improve pretend play skills or creativity in the intervention group compared to the control group. Reasons for the nonsignificant findings for the intervention, suggestions for future refinement of the intervention, and implications for childhood development are discussed.

Key Words: pretend play, creativity, preschoolers, play intervention, divergent thinking

Pretend Play and Creativity in Preschool-Aged Children: Associations and Brief Intervention

Pretend play involves fantasy, make-believe, and the use of one object “as if” it were another object (Fein, 1987; Russ, 2004; D. Singer & J. Singer, 1990). It is most prominent during the preschool years and is associated with positive developmental tasks such as creativity, problem solving, coping, emotion regulation, and general adjustment (see Russ, 2004, for review). Pretend play relates to creativity in a large number of studies and has facilitated creativity in some studies (Dansky, 1999; Russ & Wallace, 2013). However, Lillard et al. (2013) raised methodological concerns about both correlational and experimental studies. One purpose of this study was to replicate a previous study of pretend play and divergent thinking in preschool-aged children (Kaugars & Russ, 2009) and include multiple measures of creativity. A second purpose of the study was to test the effectiveness of a brief play intervention that was found to be effective at improving pretend play skills during a pilot study (Christian Fehr, & Russ, 2011).

Pretend Play and Creativity

Russ (2004) identified two pretend play processes hypothesized to relate to creativity through distinct mechanisms: cognitive processes and affective processes. Cognitive processes involve imagination, symbolism, and organization of the story within the play narrative (‘play’ refers to pretend play throughout this article). Affective processes involve emotional expression within the story. Most of the research in the creativity and play area has used divergent thinking as the measure of creativity. Theoretically, children practice divergent thinking in pretend play (Singer & Singer, 1990). Also, access to affect in fantasy broadens the search process for ideas, images, and memories important in creativity (Fein, 1987; Russ, 1993, 2014).

Divergent thinking. Both cognitive and affective processes have been proposed to

facilitate divergent thinking, a key component in creative problem solving. Divergent thinking is the ability to generate a variety of ideas or themes (Guilford, 1968). A positive relationship between pretend play and divergent thinking has been supported independent of intelligence (Hoffmann & Russ, 2012; Kaugars & Russ, 2009; Pepler & Ross, 1981; Russ & Grossman-McKee, 1990; D. Singer & Rummo, 1973) and longitudinally (Clark, Griffing, & Johnson, 1989; Russ, Robins, & Christiano, 1999; Wallace & Russ, 2015). Dansky (1980) found that this relationship was mediated specifically by make-believe play, highlighting the importance of imaginative aspects in play. In addition to correlational studies, experimental manipulations suggest that pretend play facilitates divergent thinking. For example, preschool children provided with a play period were able to identify more uses for objects than children in a control group without a play period (Dansky, 1980; Dansky & Silverman, 1973). However, a replication of this study with a separate examiner administering the divergent thinking task failed to confirm the increase in divergent thinking following the play task (Smith & Whitney, 1987). Based on Dansky's (1980) proposition that make-believe play assists in loosening the old associations by temporarily creating a new cognitive set, Russ (1993) suggested that changing experimenters might have interfered with the experimental set induced, thus cancelling the experimental effect of the play. In their daily lives, children are frequently moving in and out of the pretend play world. Thus, they may be strengthening the new cognitive set with each play period, resulting in a more stable creative cognitive set over time.

A recent review raised questions about the methodological rigor of the correlational and experimental studies that have found relationships between play and creativity (Lillard et al., 2013). These authors were particularly concerned about experimenter bias when the same researcher administered the play and creativity measures and the lack of control groups in many

of the experimental studies. However, a number of correlational studies have used different examiners for task administration (see Russ & Wallace, 2013, for a review). Although the lack of adequate control groups remains an issue, Dansky (1999) and Russ and Wallace (2013) concluded that there are rigorous studies in the literature that have found that play facilitated creativity.

The majority of studies examining pretend play and divergent thinking have not distinguished between the impact of cognitive and affective play processes. One exception is the work of Russ and colleagues. Using a play task that measures cognitive and affective processes, both imagination and affect expression in play related to divergent thinking in first and second graders, even when controlling for intelligence (Hoffmann & Russ, 2012; Russ & Grossman-McKee, 1990; Russ & Peterson, 1990). A follow-up study of the Russ and Peterson (1990) sample found that imagination in play predicted divergent thinking four years later (Russ et al., 1999). In the only study to date that examined the association between cognitive and affective play processes and divergent thinking in preschool-aged children by using the Affect in Play Scale-Preschool version (APS-P), affect expression in play, comfort in play, and the amount of pretend play displayed related to the number and novelty of responses on a measure of divergent thinking (Kaugars & Russ, 2009). These results suggest that both cognitive and affective processes relate to divergent thinking in preschoolers.

Creative storytelling. Creative performance tasks, including storytelling, are a separate and important domain identified within creativity research (Amabile, 1990; Baas, De Dreu, & Nijstad, 2008). According to Hennessey and Amabile (1988), subjective assessments of creativity include acceptability, an essential feature of creativity often neglected in objective creativity assessments that include originality and fluency. Similarly, Stein (1974) defined

creativity as a product that is novel and appropriate. In other words, although a response might be unique, it is only considered creative when it is useful to the task at hand. In contrast to divergent thinking, storytelling evaluates broader creativity by examining real-life products which are evaluated by others. There has been some research support for the relationship between divergent thinking and creative storytelling in school-aged children (Hoffmann & Russ, 2012, 2016; Russ et al., 1999), supporting the assessment of multiple domains of creativity. However, an examination of the relationship between divergent thinking and creative storytelling in preschool-aged children has not been conducted.

Pretend play is conceptually related to storytelling as children develop a story and play it out during pretend play. Nicolopoulou (2007) proposed a model highlighting the reciprocal relationship between pretend play and storytelling development. Hoffmann and Russ (2012) found that imagination and positive affect in play were associated with storytelling creativity in a sample of school-aged girls. The authors argued that these results provide empirical support for the theorized link between positive affect in play and creativity. However, the relationship between pretend play and storytelling has not yet been investigated in preschool-aged children.

Given the limited evidence supporting the relationship between pretend play processes and types of creativity in preschool-aged children, one goal of the current study was to investigate the relationships among pretend play processes, divergent thinking, and creative storytelling. It was expected that both cognitive and affective play processes would uniquely explain a portion of the variance in both divergent thinking and creative storytelling. Gender differences were also examined given the unexpected findings by Fehr and Russ (2013) indicating that preschool-aged girls had more developed pretend play skills than preschool-aged boys.

Play Skills Interventions

Creativity is an important ability to foster in childhood, and pretend play may be one way through which creativity can be improved. Play skills interventions have been effective at increasing pretend play and development in related areas such as divergent thinking, coping, problem solving, and life satisfaction (Hartmann & Rollett, 1994; Rosen, 1974; Moore & Russ, 2008; Russ, Moore, & Farber, 2004). However, the interventions are often broad, time-intensive interventions developed for specific populations with documented play deficits, such as children from disadvantaged backgrounds (see Danksy, 1999, for review) or children diagnosed with developmental disabilities or autism spectrum disorders (see Barton & Wolery, 2008, and Lang et al., 2009, for reviews). Although targeted interventions developed for children with specific play deficits fill a need for those groups, they may not be transferrable to children with other constellations of play deficits or to facilitate general development. Furthermore, inconsistencies and methodological concerns within the play intervention literature for at-risk populations make drawing conclusions difficult. Methodological concerns identified by Russ and Fehr (2013) include variety within the intervention strategies used, wide-ranging length and duration of intervention sessions, diverse outcomes measured, small samples sizes, inadequate control groups, and not reporting fidelity. There is also a lack of long-term follow-up to assess stability of intervention gains. Another limitation in the literature is that, until recently, play interventions did not specifically target affect expression. Given the importance of affective processes for children's development of creativity and emotion regulation (Russ, 2004), targeting affect expression in play interventions is likely to bolster the impact of the intervention across developmental tasks.

Russ and colleagues have developed and tested a play intervention designed to improve

cognitive and affective play skills in typically developing children. An empirically-supported play intervention for typically developing children could facilitate the development of pretend play and creativity in all children and be adapted for a variety of populations with specific deficits in pretend play, such as children with anxiety or developmental delays. In addition to targeting typically developing children, the protocol by Russ and colleagues is the only play intervention to date that targets the facilitation of both cognitive and affective processes. For a description of the development of the strategies and intervention approach, see Russ, Fehr, and Hoffmann (2013). This standardized intervention protocol has been examined in three empirical, randomized studies of school-aged children, each of which obtained positive results (Hoffmann, Fiorelli, & Russ, 2012; Hoffmann & Russ, 2016; Russ et al., 2004). Hoffmann and Russ (2016) adapted the play intervention to be used in a group format. Maintenance of treatment gains has also been found. A 4- to 8-month follow-up study of Russ and colleagues (2004) found higher imagination and positive affect scores at follow-up for an intervention group aimed at improving imagination compared to the control group (Moore & Russ, 2008). Taken together, these results provide preliminary evidence that this pretend play intervention is effective at improving both cognitive and affective play processes and in turn, divergent thinking, coping, and life satisfaction.

Following the initial success of the school-aged intervention, the protocol was adapted for use with preschoolers with promising results (Fehr, Christian, & Russ, 2016). The current study aimed to build upon the results obtained during the pilot study by testing the brief play skills intervention with a larger sample of preschoolers within a preschool setting. If effective, these results could have long-term implications for children's pretend play, creativity, and general development and could be easily implemented by parents or teachers of preschoolers as a

prevention or intervention approach.

Method

Pilot Study

Two changes were made when adapting the school-aged play intervention for preschoolers (Fehr et al., 2016). First, parents were involved in for each session and were asked to conduct additional play sessions at home. Second, researchers were sensitive to the developmental level of these young children and thus had different play skill expectations and within-session interactions than would be used in the school-aged intervention.

In the pilot study, 17 four- to six-year-old children (age $M = 4.74$, $SD = 0.72$, 59% male) were recruited from a local children's museum and randomly assigned to receive three 20-30 minute sessions of the play intervention or activities control (i.e., coloring, putting together puzzles, putting together a building toy). In both groups, parents observed play sessions and were asked to conduct play sessions at home based on parent observations of the play sessions. The APS-P, the Multidimensional Stimulus Fluency Measure (MSFM; Godwin & Moran, 1990; Moran, Milgram, Sawyers, & Fu, 1983), and a storytelling task were administered at baseline and outcome to assess the effectiveness of the intervention. Given the small sample size, effect sizes were used to examine treatment effectiveness. Preliminary results were that children in the intervention group had increased imagination, organization, and positive and negative affect expression in their play compared to the control group, with medium to large effect sizes (Christian et al., 2011). More detailed scoring and analyses, including examining differences in divergent thinking and creative storytelling following intervention, are currently being conducted (Fehr et al., 2016).

This pilot study was effective at improving play skills after only three sessions.

However, unanticipated variability was identified, which suggested areas to be addressed in the randomized controlled trial to follow. First, many of the children acted quite differently with their parents in the room. It was difficult to engage some children and when given a prompt by the facilitator, many children became shy or deferred to their parents. Second, parental involvement was inconsistent in terms of the quantity of home play sessions conducted, the content included in those sessions, and whether they followed the principles of their group assignment. Third, scheduling inconsistencies in the community setting made it difficult to control for time between sessions. Due to these concerns, the current study occurred in a preschool setting without parents. In addition, the story stems provided in the play intervention manual were tested during the pilot phase, and a standardized set of stories with increasing complexity across sessions emerged naturally and were adopted.

Current Study

Participants. Forty-one preschoolers (ages 4-6 years) participated in this study. A power analysis computed with a large effect size, based on pilot data, and power set at .80, revealed that 21 children needed to participate (Faul, Erdfelder, Lang, & Buchner, 2007). Originally, 48 participants were recruited from a local preschool (20.43% participation rate), but 2 children were not included due to scheduling difficulties, 1 parent later decided not to participate, 1 child chose not to participate during the assent process (brief script read to child asking if they want to participate), and 1 child was excluded due to a preexisting acquaintance with one of the research assistants. Additionally, 2 parents did not consent to optional videotaping of their child's sessions for research and fidelity purposes, and only children with videotaped data were included in the current analyses. For the 38 participants that the school provided birthdates for, the mean age was 56.50 months ($SD = 4.43$ months). The majority were female ($n = 23$), and most were

enrolled in full-day ($n = 26$) instead of half-day preschool. Children were mainly Caucasian (80.5%), with 7% identified as biracial, 5% identified as Hispanic or Latino, 2.5% identified as Asian American, 2.5% identified as African American, and 2.5% identified as Pacific Islander.

Procedure. Consent forms were sent home with all children at a local preschool. Before any children were included in the study, a school representative introduced the researchers to each classroom with participating children. Each participating child had five sessions that lasted 20-30 minutes: the baseline assessment, three play sessions, and an outcome assessment. Baseline and outcome measures were conducted by a researcher blind to the children's intervention condition. After the baseline session was completed, children were randomly assigned to the play skills intervention or activities control group. The play facilitators were separate from the researchers that administered the baseline/outcome measures and were blind to baseline results. Baseline and outcome play and creativity measures were scored by researchers blind to children's other scores. Each session occurred at the preschool approximately one week apart.

Play skills intervention group. Following all aspects of the standardized play intervention manual, children in the play skills intervention group met individually with the play facilitator, were provided with a standardized set of toys, and played out 3-4 story stems. Story stems alternated between those that emphasized imagination (e.g., a story about a boy going to the moon) and emotion expression (e.g., a scary story about a boy who hears a scary sound) and were presented with progressively increasing difficulty. The play facilitator engaged in the child's play while following the child's lead. A variety of prompts and comments were used to encourage the child's play development, including modeling, praise, summarizing the story, asking questions, and labeling feelings. The play facilitator kept notes each session and

emphasized interventions aimed at the child's specific play weaknesses the next session. Over the course of the three sessions, the play facilitator gradually decreased her involvement in the play and encouraged the child to play more independently so that by the last story of the last session the play facilitator aimed to give minimal input, allowing the child to play independently.

Control group. Children assigned to the activities control condition also played individually with the play facilitator. Children choose puzzles, coloring sheets, or to assemble a pre-formed object (plastic pieces that built a television character). Materials without fantasy content were chosen, such as puzzles and coloring pages with animals, flowers, and trains. The play facilitator engaged with the child and provided prompts and comments in a similar manner as the intervention group to control for the amount of adult interaction. For example, play facilitators modeled strategies to put together a puzzle, provided factual information or asked questions about the task at-hand such as discussing trains when completing a train puzzle, summarized the child's activities, and provided praise for on-task behavior/effort. Imagination and affect expression were not encouraged and spontaneous fantasy by the child was ignored.

Fidelity. Play facilitators were three graduate students in psychology. All trained and met with the clinical psychologist who developed the school-aged play intervention (second author, S.R.) Two of the graduate students were involved in the pilot intervention and administered the intervention through that study with supervision. The third graduate student received additional training and direct supervision on the preschool play intervention with the primary play facilitator (first author, K.F.).

All play facilitators completed behavioral checklists of session content and their own behavior for each session, regardless of group assignment. During intervention sessions, play facilitators completed checklists that they: encouraged the child to use objects in alternative

ways, asked the child to make up an alternate ending to at least one story, summarized the story, reflected and asked the child to label and explore the feelings of the characters, and modeled imaginative ideas and emotional expression. During control sessions, play facilitators completed checklists that they: asked the child questions about the activity and their actions, praised the child for effort, and followed the child's lead. An undergraduate in psychology blind to study hypotheses watched 20% of the videotaped sessions for each play facilitator ($n = 22$) and rated the session for fidelity. For each session, she rated play facilitators on a 5-point Likert scale on five dimensions: verbal praise, warmth, engagement, redirection/direction, and on-task behavior. To test for adherence to condition assignment and possible cross-contamination, specific prompts and behaviors of the play facilitators were also examined with frequency counts for behaviors in eight categories: praise/positive reinforcement for on-task behavior; praise for fantasy in play; praise for emotional expression; describe or summarize; model or prompt imagination in play; model, label, or prompt feelings in play; model or prompt on-task behavior; and interact with child using questions or prompts. These behaviors were identified as those the play facilitators should be adhering to in order to encourage play skill advancement in the intervention and to control for verbal praise, instruction, and modeling in the control sessions.

Measures.

Affect in Play Scale-Preschool version. The APS-P (Kaugars & Russ, 2009) is a five-minute standardized play task that assesses imagination, organization, comfort, and affect in the child's play. The child is introduced to the toys (i.e., stuffed and plastic animal figures, a plastic car, three plastic cups, "hairy" rubber ball), provided with a standardized story stem example, and asked to play with the toys to play out a story. Imagination, Organization, Elaboration, and Comfort are scored based on a 5-point Likert scale. Imagination measures the child's ability to

engage in fantasy play and the uniqueness of their play events. Organization assesses the quality of the plot and coherence of the narrative. Elaboration measures the complexity and embellishment in the themes, toys used, sound effects, and characters. Comfort measures the child's comfort and involvement in the play. Verbal and nonverbal affect within the child's story narrative is counted to form the Total Affect, Positive Affect, Negative Affect, and Undefined Affect scores. The Undefined Affect score is a count of affect that does not clearly fall into the positive or negative affect category (e.g., "whoosh," animal or car noises). Variety of Affect is the number of affect subcategories expressed. The number of 20-second segments in which Pretend Play or No Play is the predominant type of play is also coded.

Psychometric properties are adequate to excellent for this measure, with intraclass correlation coefficients for normal preschool populations ranging from .66 to .96 (Fehr & Russ, 2013, 2014; Kaugars & Russ, 2009). Internal consistency was also high, with .88 for the split-half reliability correlation for the frequency of affect (Kaugars & Russ, 2009). Construct validity has been supported in five studies across different research programs (Fehr & Russ, 2013; Kaugars, 2001; Kaugars & Russ, 2009; Marcelo & Yates, 2014; Yates & Marcelo, 2014). In the current study, all APS-P videos were coded by one researcher who had been trained on the measure and reached adequate scoring reliability prior to the study. Interrater reliability was assessed by having an independent rater score a random selection of 20 of the videos (49%). Interrater reliability was determined using an intraclass correlation coefficient (ICC). A two-way (Target x Judges) mixed model was used, testing for absolute agreement with a 95% confidence interval. This is a more rigorous measure of interrater reliability because it measures absolute agreement rather than consistency between raters (Shrout & Fleiss, 1979). The average scores for the ICC were .92 for Pretend Play, .92 for No Play, .94 for Imagination, .92 for

Organization, .94 for Elaboration, .85 for Comfort, .99 for Total Affect, .94 for Variety of Affect, .99 for Positive Affect, .98 for Negative Affect, and .96 for Undefined Affect, indicating excellent interrater reliability.

Multidimensional Stimulus Fluency Measure. The Multidimensional Stimulus Fluency Measure (MSFM; Godwin & Moran, 1990; Moran, Milgram, Sawyers, & Fu, 1983) has been widely accepted as a measure of divergent thinking for preschoolers as it assesses ideational fluency, the best single measure of divergent thinking, and is a predictor of creativity (Wallach & Kogan, 1965). It has been used with preschool populations as a measure of original thinking and creative potential, with results supporting external validity of the test score interpretations (Farver, Kim, & Lee-Shin, 2000; Godwin & Moran, 1990; Hong & Milgram, 1991; Moore & Sawyers, 1987; Moran et al., 1983; Tegano & Moran, 1989) independent of both intelligence (Hong & Milgram, 1991; Moore & Sawyers, 1987; Moran et al., 1983) and gender (Tegano & Moran, 1989). A longitudinal study found that the scores on this six-item scale were relatively stable from 4 years of age to 7-8 years of age (Moore & Sawyers, 1987). The two main scores are Fluency and Novelty. Fluency is the sum of acceptable responses the child gives to each item. Acceptable responses are typically obvious. However, in cases where there was a question regarding the acceptability of a response, the first author consulted with another seasoned child psychologist (second author, S.R.). Novelty is the sum of responses given by less than 5% of the sample. The Novelty score has been suggested to be the preferred score for creativity because the Fluency score contains components of both ideational fluency and verbal fluency (Godwin & Moran, 1990).

Storytelling task. Although theoretically related, pretend play and creative storytelling are distinct tasks. In pretend play, children use verbal and nonverbal components to act out a

story that he or she makes up independently. In contrast, the creative storytelling task requires the child to verbally respond to visual stimuli provided in a picture book. In the current study, children were presented with Mercer Mayer's (1967) picture book, *A Boy, a Dog and a Frog*. Children were asked to tell "the kind of story we would read in a book." The first half of the book was used at baseline, and the second half of the book was used at outcome. In order to evaluate creativity performance and acceptability to others (Amabile, 1990; Baas, De Dreu, & Nijstad, 2008; Hennessey & Amabile 1988), stories were scored based on the consensus scoring system defined by Hennessey and Amabile (1988) in which Creativity (i.e., amount of useful additions to the story), Imagination (i.e., amount of additions to the story beyond what is present in the pictures), Novelty (i.e., uniqueness of imaginative aspects), and Likeability (i.e., overall interest and enjoyment of the story) are each rated on a five-point Likert scale. Raters are not provided with any training or anchor points (Hennessey & Amabile, 1988). Instead, raters are asked to rate the stories in relation to each other. This ensures that this measure of creativity assesses subjective acceptability, an essential component of creativity assessment in addition to fluency and originality (Hennessey & Amabile, 1988),

Two raters familiar with children's storytelling scored each story. Interrater reliability was computed with a two-way mixed model ICC testing for consistency between the two independent raters. Given the subjective nature of this task and the lack of anchor points, raters were not expected to have consistent absolute ratings but were expected to have scored the stories similarly in relation to each other. Thus, ICCs were tested for consistency rather than absolute for these scores. The ICCs for average scores at baseline were .81 for Creativity, .89 for Imagination, .91 for Novelty, and .89 for Likeability, indicating excellent consistency between raters. Thus, the raters' scores for each scale were averaged. In addition, reliability of

the four scores was examined. Cronbach's alpha was .97, and deletion of individual variables would have decreased the alpha coefficient. As these scales were internally consistent and highly correlated (correlations ranged from .85 to .92), the storytelling variables were averaged to form an overall Storytelling Creativity score, which was used in all subsequent analyses.

Results

Data Analysis Plan

Pearson product-moment correlation coefficients were computed for hypothesized baseline relationships (one-tailed) and exploratory relationships between age and pretend play, divergent thinking, and storytelling creativity (two-tailed). Multiple regressions were computed to examine the proportion of the variance in the creativity measures explained by the pretend play variables at baseline. Independent samples t-tests were used to explore gender differences in pretend play and creativity and to test for differences in fidelity across group assignment and play facilitators (as one graduate student only completed sessions for two children, group differences were only examined for the other two play facilitators). To assess the effectiveness of the intervention, repeated measures analyses of variance were computed for each dependent variable (APS-P Pretend Play, Imagination, Organization, Elaboration, Positive Affect, Negative Affect, Undefined Affect, Variety of Affect; MSFM Fluency, Novelty; Storytelling Creativity), with group assignment as the independent variable. A one-way between-groups multivariate analysis of variance was performed to investigate group differences based on condition assignment in the overall change in play from baseline to outcome.

Pretend Play and Creativity

Means and standard deviations are provided in Table 1. There were no significant differences between males and females on any of the APS-P pretend play variables, the MSFM

variables, or Storytelling Creativity (Table 1). Age was moderately positively related to APS-P Pretend Play, Imagination, Organization, Elaboration, Comfort, and Total Affect (Table 2). Age was also positively related to Storytelling Creativity. Therefore, partial correlations controlling for age were computed to examine the relationships among pretend play, divergent thinking, and creative storytelling. Inspection of the zero order correlations suggested that controlling for age had little effect on the strength of the relationships between pretend play and creativity (see Table 2).

Pretend play and divergent thinking. As hypothesized, pretend play variables related to MSFM variables even after controlling for age (Table 2). MSFM Fluency was positively related to APS-P Organization, Elaboration, and Positive Affect. MSFM Novelty was positively related to APS-P Pretend Play, Organization, Elaboration, Comfort, Total Affect, Undefined Affect, and Variety of Affect. MSFM Novelty was negatively related to APS-P No Play.

Hierarchical multiple regressions (Table 3) were used to assess the proportion of the variance in divergent thinking explained by pretend play, after controlling for the influence of age. As APS-P Imagination and Organization were highly correlated ($r = .91$), only APS-P Organization was included to represent the cognitive play process, as this variable was more strongly related than APS-P Imagination to the dependent variables (MSFM Fluency, MSFM Novelty, Storytelling Creativity). As APS-P Total Affect was not significantly related to MSFM Fluency and Storytelling Creativity, APS-P Positive Affect was included to represent the affective play process in the regressions predicting those variables.

To examine MSFM Fluency, age was entered at Step 1, explaining 1% of the variance. After entry of APS-P Organization and Positive Affect at Step 2, the total variance explained by the model was 15.4%, $F(3, 34) = 2.06$, $p = .12$. The pretend play variables explained an

additional 15.3% of the variance in MSFM Fluency after controlling for age, but this did not reach statistical significance, R^2 change = .15, F change (2, 34) = 3.08, $p = .06$. To examine MSFM Novelty, age was entered at Step 1, explaining only 1% of the variance. After entry of APS-P Organization and Total Affect at Step 2, the total variance explained by the model was 15.5%, which was not statistically significant, F (3, 34) = 2.07, $p = .12$. The play variables explained 15.3% of the variance in MSFM Novelty after controlling for age but this addition was also not statistically significant, R^2 change = .15, F change (2, 34) = 3.09, $p = .06$. Individual cognitive or affective play processes did not uniquely contribute to either of these models.

Pretend play and storytelling creativity. Storytelling creativity was also related to pretend play variables as hypothesized (Table 2). After controlling for age, Storytelling Creativity was positively related to APS-P Imagination, Organization, Elaboration, Comfort, Positive Affect, and Variety of Affect. A hierarchical multiple regression (Table 3), with age entered at Step 1 explained 6.4% of the variance in Storytelling Creativity. After entry of APS-P Organization and Positive Affect at Step 2, the total variance explained by the model was 23.4%, F (3, 34) = 3.46, $p = .03$. The pretend play variables significantly explained 17.0% of the variance in Storytelling Creativity after controlling for age, R^2 change = .17, F change (2, 34) = 3.77, $p = .03$. Neither APS-P Organization nor APS-P Positive Affect made a statistically significant contribution to the overall model. Therefore, the overall model was supported with pretend play significantly explaining a portion of the variance in Storytelling Creativity after controlling for age. Similar to the results found when examining MSFM Fluency and Novelty, the cognitive and affective processes did not independently contribute to the overall model, suggesting the impact of overall pretend play ability rather than individual play processes.

Divergent thinking and storytelling creativity. As hypothesized, a moderate correlation was found between Storytelling Creativity and MSFM Fluency, even after controlling for age ($r = .36, p = .01$; Table 2). Results indicated approximately 14% shared variance between MSFM Fluency and Storytelling Creativity. This moderate correlation indicated that the two measures of creativity were positive related, though a large amount of variance was unique to each measure. The relationship between MSFM Novelty and Storytelling Creativity did not reach statistical significance, indicating that the variables were measuring distinct constructs.

Play Intervention

Fidelity. There were no differences between play facilitators in the amount of change children displayed in pretend play, divergent thinking, or creative storytelling, indicating experimenter effects were not likely to impact the results. Based on the checklists completed by play facilitators after each session, play facilitators completed 98.32% of the target behaviors in the intervention sessions and 100% of target behaviors in the control sessions. Based on the independent ratings of videotaped sessions, there were no differences between conditions for overall ratings of play facilitators' verbal praise, warmth, engagement, redirection/direction, or on-task behavior. Frequency counts of individual behaviors indicated that play facilitators praised, prompted, or modeled fantasy and emotional expression in the intervention group sessions ($M = 22.42, SD = 7.13, M = 15.67, SD = 5.57$, respectively) significantly more than in the control group sessions ($M = 0.40, SD = 0.52, M = 0.00, SD = 0.00$, respectively), $t(20) = 9.71, p < .001$; $t(20) = 8.87, p < .001$, respectively. Overall instances of praise and verbal interaction of the play facilitators did not differ across groups. These findings suggest that the play facilitators succeeded in interacting with the children in a similar way across groups while also adhering to session goals and minimizing cross-contamination.

Play intervention effects. Means and standard deviations for the intervention and control groups at baseline and outcome are shown in Table 4. For APS-P Pretend Play, the interaction and the main effects for time and group assignment were not significant. This indicates there was no significant change in the amount of pretend play for participants over the course of this study. For APS-P Imagination, Organization, and Elaboration, the interactions between group assignment and time and the main effects for group assignment were not significant. The main effects for time were significant, with Imagination, Organization, and Elaboration increasing for both groups from baseline to outcome, $F(1, 39) = 7.71, p < .01, \eta_p^2 = .17$; $F(1, 39) = 6.75, p = .01, \eta_p^2 = .15$; $F(1, 39) = 11.81, p < .01, \eta_p^2 = .23$; respectively. For APS-P Positive Affect, Negative Affect, and Undefined Affect, the interactions between group assignment and time were not significant. The main effects for time and group assignment were also not significant. For APS-P Variety of Affect, the interaction between group assignment and time and the main effect for group assignment were not significant. The main effect for time was significant, $F(1, 39) = 6.53, p = .02, \eta_p^2 = .14$, suggesting that Variety of Affect improved for both groups from baseline to outcome. For MSFM Fluency, MSFM Novelty, and Storytelling Creativity, the interactions between group assignment and time were not significant. The main effects for time and group assignment were also not significant.

These results suggest that the play intervention was not effective at improving pretend play, divergent thinking, or storytelling creativity variables to a statistically significant level. A one-way between-groups multivariate analysis of variance (MANOVA) was computed to examine whether pretend play overall had changed based on group assignment. There was not a significant difference between the intervention and control group on the combined dependent variables, $F(6, 34) = 0.79, p = .59$; Wilks' Lambda = 0.88; $\eta^2 = .12$. However, an examination of

the means indicated that the intervention group displayed more change in the predicted direction on the hypothesized variables than the control group (See Table 5).

Discussion

Relationships between Pretend Play and Creativity

The major finding in this study was that pretend play was related to divergent thinking and creative storytelling, after controlling for age, supporting the link between pretend play and creativity. Specifically, the results supported the hypothesized relationship between divergent thinking and pretend play in preschoolers. Kaugars and Russ (2009) found that the amount of pretend play, affect, and comfort in the play related to divergent thinking variables in preschool-aged children. The current study replicated these results and found additional relationships with imagination, organization, elaboration, and the variety of affect categories expressed. The strength of the relationships in the current study were moderate and similar to the effect size identified between pretend play and divergent thinking in a previous meta-analysis (Fisher, 1992). These results are also consistent with the relationship between pretend play and divergent thinking found in school-aged children (Hoffmann & Russ, 2012, 2016; Russ & Grossman-McKee, 1990; Russ et al., 1999; Russ & Schafer, 2006). It is not clear why the additional associations with pretend play variables were not found in the Kaugars and Russ sample, but it is possible that having a slightly larger sample increased the power to find these relationships. It is also possible that the power to detect these differences could have been increased in this sample as the children engaged in more pretend play ($M = 8.89$, $SD = 4.99$) than the children in the previous sample ($M = 4.33$, $SD = 4.93$; Kaugars & Russ, 2009).

The results of this study also expanded the literature on creativity and pretend play in preschoolers by including two measures of creativity: divergent thinking and creative

storytelling. As hypothesized, imagination, organization, elaboration, comfort, and positive affect in play related to creative storytelling. Although this connection had not previously been examined in preschoolers, the pattern of relationships replicated those found in school-aged children (Hoffmann & Russ, 2012, 2016). The hypothesized connection between pretend play and narrative development in preschoolers was also supported (Nicolopoulou, 2007).

Cognitive and affective variables both related to divergent thinking and storytelling creativity, thus supporting the hypothesized relationships between each of the play processes and creativity. A hierarchical multiple regression predicting storytelling creativity revealed that the pretend play variables significantly accounted for 17.0% of the variance in storytelling creativity. Hierarchical multiple regressions controlling for age indicated that the cognitive and affective play variables together accounted for 15.3% of the variance in divergent thinking, although these contributions did not reach statistical significance. In both cases, neither the cognitive or affective play processes made an independent contribution to the overall models. This suggests that in this age group, a child's overall pretend play ability may be more predictive of creativity development than specific play processes. Pretend play processes may be less differentiated at this early age, especially as compared to the pretend play of school-aged children. An exploratory factor analysis with the APS-P found that positive affect loaded on the cognitive factor in preschoolers rather than with negative and undefined affect, suggesting that organization, imagination, and positive affect may be more related in this age group (Fehr & Russ, 2014). If this finding is verified in a confirmatory factor analyses, this may explain why the majority of the play variables were related to creativity in the current study with preschool-aged children whereas only specific variables were related to creativity in a recent study with a school-aged sample (Hoffmann & Russ, 2012). Perhaps examining the pattern of relationships in

preschoolers is more important than the individual variable relationships supported in school-aged children due to the level of development and lack of process differentiation at this age.

Alternately, positive and negative affect may relate differentially to creativity development in preschool-aged children. Similar to the results of Hoffmann and Russ (2012), positive affect in the current study was related to creativity but negative affect was not. As reviewed in Russ (1993), expression of positive affect induces a positive mood state, which in turn facilitates creativity in adults. Russ hypothesized that play could be one way in which children might express positive affect, thus inducing a positive mood state and facilitating creativity. Another affective process described by Russ is the expression of affect in fantasy, which broadens the ability to access and use additional affect-related content and memories. The ability to access affective material is important for creativity. Russ suggested that children who use play to express affective content may subsequently be able to access a richer network of affective material. The results of the current study support both of these hypothesized mechanisms.

Although hypothesized to also relate to creativity, negative affect in play was not related to creativity in the current study. This finding was unexpected given psychodynamic literature that suggests expression of both positive and negative affect in play can be beneficial (see Russ, Fiorelli, & Cain Spanngel, 2011, for review). On the other hand, Masters, Barden, and Ford (1979) found that inducing negative mood states decreased learning in children. Perhaps mechanisms associated with the decrease in learning also affect the creative process. Russ (1993) suggested that the short-term effects of affect expression may differ from the long-term effects. Perhaps negative affect expression decreases creativity in the short term but facilitates affect regulation and other aspects of development that could increase creativity and problem solving in

the long term. Negative affect may also serve a different purpose at specific developmental stages. Given the results of the exploratory factor analysis that negative and undefined affect loaded on a different factor than the cognitive play scores and positive affect (Fehr & Russ, 2014), perhaps negative affect functions as a unique play process during the preschool age.

Given the criticism of Lillard et al. (2013) that the same examiner administered the play and creativity measures, the current study used three undergraduates who were not invested in the study hypotheses to administer the standardized play and creativity measures. Furthermore, scoring was completed separately for the play and creativity measures by researchers blind to participant scores on the other play or creativity measures. In fact, the storytelling and divergent thinking tasks were completely de-identified before being provided to the raters for scoring. Taken together, the possibility of experimenter bias accounting for the relationship between play and creativity in this study seems unlikely.

As hypothesized, the two measures of creativity included in this study (creative storytelling and divergent thinking) were correlated, but only at a moderate level. Specifically, results indicated that only 7-13% of the variance in the relationship between divergent thinking and creative storytelling was shared variance. This suggests an underlying creative process but also unique variance in the relationship. The moderate correlation between divergent thinking and creative storytelling in the current study provides evidence that more than one measure of creativity should be included when examining the creative processes. Hennessey and Amabile (1988) emphasized the importance of creative tasks that are assessed in objective and subjective ways as these methods of assessment likely reveal different aspects of creative performance. Baas et al. (2008) argued that measures can assess three domains within creativity, including open-ended tasks such as divergent thinking, tasks with a correct solution such as insight tasks,

and performance-based tasks in which creativity is based on the evaluation of others such as storytelling or art. Future studies on creativity should keep these recommendations in mind and include more than one type of creativity assessment accordingly, although future studies are needed to provide guidance on which types of assessments are most helpful in which situations.

Play Skills Intervention

The main hypothesis that the intervention would improve play and creativity when compared to the active control group was not supported. As Lillard et al. (2013) speculated, it is possible that play does not facilitate creativity. Lillard and colleagues raised questions about the methodological rigor of previous intervention studies. The present study had a rigorous research design in terms of random assignment, an active control group, and researchers blind to condition assignment administering baseline and outcome measures. With this rigorous control, the intervention was not effective. In that respect, these nonsignificant findings were similar to those of Russ and Seja (2001) in a one-session play experience for elementary school students where play did not facilitate divergent thinking.

Alternate explanations for the nonsignificant results of the intervention in this study are also plausible. First, it is possible that this particular intervention is not effective at increasing pretend play and creativity in preschool-aged children. Perhaps there was not enough modeling and scaffolding to the individual child's level or that the intervention was too global. Second, preschool is a specific age-group with unique developmental needs. Parent coaching may be necessary at this young age for the play intervention to be effective. In the pilot study, the parents were present and conducted play sessions at home with their children (Fehr et al., 2016). Although interventions that occur only at school have been effective for school-aged children, a home environment that encourages pretend play may be more important to foster these skills

during the preschool years. When asked for feedback, parents during the pilot phase of this study frequently commented on their increased awareness of their child's pretend play and the importance of developing their child's pretend play skills (Fehr et al., 2016). Perhaps the pilot was effective because it changed the home environment and/or parent interactions around pretend play, as well as play skills.

Many play variables increased over the course of the study regardless of condition assignment. The effect of time may be accounted for by a pattern of natural development, improvement related to co-occurring factors, or a confounding effect within the control group. Children's pretend play during the preschool years may be developing at such a rapid pace that natural improvements can be distinguished even over short periods of time. This would make additional improvements beyond natural development difficult to detect. In addition, the current intervention took place at a preschool that values and encourages pretend play, and it may be that all children received informal play intervention in the classroom or at home. The stability of pretend play skills during this period of development and the impact of various settings on the development of pretend play skills have not yet been examined.

Methodological issues such as limited power due to the small sample size or intervention dosage or frequency may also explain why significant results were not found in the current study. Three sessions were chosen for the current study as that was an effective dose during the pilot phase. However, the pilot included additional play sessions that parents conducted at home. Thus, the actual dosage and frequency of sessions were likely higher in the pilot phase than in the current study. It is also possible that the sample used in the current study may not have been a representative sample. Overall, children displayed more periods of pretend play than was found in a previous sample (Kaugars & Russ, 2009). There may be a ceiling effect of play interventions

such that they are most effective for children with play deficits and only minimally effective for children who have developed age-appropriate play skills. The majority of play intervention studies to date have included only children with play deficits. Larger samples would increase power and allow for greater flexibility in analyses, such as examining differences in play for children with play deficiencies at baseline.

Refinement of the Intervention

The current study was novel in that it examined the impact of a very brief intervention aimed at improving pretend play skills and creativity in children in a preschool setting. Although not significant, an examination of the means from baseline to outcome suggests that the play intervention group may have displayed some improvement in pretend play skills relative to the control group. Coupled with the strength of previous findings with this intervention, the current intervention paradigm may be worth pursuing with refinement. First, the dosing of the intervention must be increased and the frequency of sessions should be considered. Given the promising results from the pilot phase, it seems that teaching parents to implement the intervention is likely to be the most fruitful route to pursue. The addition of parent sessions conducted at home could also assist in increasing the dose and frequency of play sessions. More time and effort specifically teaching the parents the intervention may increase adherence and decrease variability related to home play sessions. Second, more scaffolding and individualization are needed. Instead of conducting blind baseline assessments, the baseline results should be systematically used to guide future sessions. That way, the child's specific weaknesses can be targeted more thoroughly from the beginning, and less attention can be spent on play skills the child has already developed. Third, given preschoolers' rapid development, it seems necessary to include a no-contact control in addition to the activities control group to

compare the effect of the intervention to natural development. Knowing the natural rate of change in play skills during this age group would allow us to assess how much the intervention is adding or the amount of change that must be obtained to reach clinical significance. Fourth, a larger sample size should be used so that power is increased and so that more refined analyses can be conducted. For example, examination of the interactions between the child and play facilitator throughout the sessions could assist in determining which interventions were effective for which children at specific time points during the intervention. Finally, a more diverse sample should be included to minimize the possibility that children's play skills are already receiving attention by caring teachers or parents interested in fostering those skills. A more diverse sample would likely include children who could benefit more from the intervention, such as at-risk children or children from disadvantaged backgrounds.

Age and Gender Analyses

In this study, age and gender differences were included as exploratory analyses. Age was not expected to relate to pretend play or divergent thinking as both constructs have previously been found to be independent of age in preschool samples (Fehr, 2010; Kaugars & Russ, 2009; Moran et al., 1983). Divergent thinking was not associated with age in the current sample. However, imagination, organization, elaboration, total affect, and comfort in play were related to age. In previous studies using the APS-P, elaboration was the only pretend play variable related to age (Fehr, 2010). As these findings were unexpected, they should continue to be examined.

The storytelling creativity task was not previously used with preschoolers but was positively related to age in the current sample. In a school-aged sample, storytelling creativity and age were related (Dillon, 2010). Although it makes sense that creative storytelling ability would increase with age, raters are instructed to score the stories relative to the sample.

Therefore, it is surprising that even within the narrow preschool age range this relationship was found. Continued examinations of these relationships may shed light on the development of creative storytelling and creative writing skills.

The relationships between gender and pretend play, divergent thinking, and storytelling creativity were also explored in this study. In this sample, there were no gender differences for the pretend play variables. This was similar to the findings in the original preschool sample (Kaugars & Russ, 2009), although a previous examination found more advanced cognitive and affective play scores in females (Fehr & Russ, 2013). Another recent study using a large preschool sample ($n = 171$) found that males expressed more negative affect and less positive affect during play than females, but there were no overall differences in imagination (Yates & Marcelo, 2014). In school-aged children, the only gender difference consistently found is that boys express more aggressive affect in their play narratives (see review in Russ, 2004). The current results are consistent with the majority of the literature in this area and did not replicate the results found in Fehr and Russ (2013), suggesting imagination abilities in preschoolers likely do not differ by gender. However, the literature regarding gender and the frequency of affect expressed during pretend play in preschoolers remains mixed. There were no significant gender differences when examining divergent thinking or storytelling creativity, indicating that the creativity of males and females was similar. This replicated a previous study of preschoolers that did not find gender differences in divergent thinking (Tegano & Moran, 1989). Consistent with results in school-aged children, the current study also did not find gender differences in creative storytelling (Hennessey & Amabile, 1988).

Limitations

The limitations within this study provide important directions for future research. The

major limitation was the small sample size. Second, the relationship between play and creativity was correlational in nature. Thus, future studies teasing out causation and the relationship between play and creativity over time are required. There were also no measures of intelligence or language skills included in the current study. In school-aged children, the relationship between creativity and play has typically remained significant when controlling for intelligence (Hoffmann & Russ, 2012; Russ & Grossman-McKee, 1990; Russ & Peterson, 1990). It is expected that this pattern would be consistent in preschoolers as well because a recent study found no relationship between APS-P imagination and intelligence (Yates & Marcelo, 2014). Whether a relationship exists between play skills and verbal abilities may be more complicated as previous research has found conflicting results depending on what measure of verbal skills was used (e.g., Connolly & Doyle, 1984; Lewis, Boucher, Lupton, & Watson, 2000). Examining the relationship between language development and pretend play abilities, as measured by the APS-P, is an important future direction. Another limitation was that there was more than one play facilitator in the intervention. Having more than one play facilitator introduces additional error but also increases generalizability. The consistency between experimenters suggested that this intervention could be taught and implemented similarly by two graduate students. As a future direction is dissemination to parents and teachers, this is an important finding. Future studies will need to continue to examine fidelity across raters and effective training methods.

Conclusions

This study found a positive relationship between pretend play and divergent thinking in preschoolers, thus replicating the results of Kaugars and Russ (2009). The relationship between play and creative storytelling was a new finding and in the hypothesized direction, suggesting that pretend play is related to multiple types of creativity in this age range. This finding also

provides preliminary support of the proposed reciprocal relationship between pretend play and storytelling ability (Nicolopoulou, 2007). The hypothesis that the play intervention used in this study would improve pretend play and creativity was not supported. As this study was methodologically rigorous, these results suggest that it is possible that play does not facilitate creativity in preschoolers. However, the results also suggested future directions for refining the intervention. The relationship between pretend play and creativity during the preschool age range should continue to be examined as these are both important abilities to foster in childhood and improvements during this unique stage of development could have long-lasting positive effects on the child's general development.

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Table 1: Means, Standard Deviations, and Gender Differences at Baseline

| APS-P | Total Sample ^a | Females ^b | Males ^c | t | η^2 |
|-------------------------|---------------------------|----------------------|--------------------|--------------------|----------|
| | Mean (SD) | Mean (SD) | Mean (SD) | | |
| Pretend Play | 8.89 (4.99) | 8.20 (4.80) | 9.78 (5.21) | -1.01 | .03 |
| No Play | 2.49 (4.70) | 2.65 (4.69) | 2.28 (4.85) | 0.25 | .00 |
| Imagination | 3.02 (1.33) | 2.74 (1.25) | 3.39 (1.38) | -1.58 | .06 |
| Organization | 2.98 (1.37) | 2.74 (1.25) | 3.28 (1.49) | -1.26 | .04 |
| Elaboration | 2.68 (1.15) | 2.57 (1.24) | 2.83 (1.04) | -0.74 | .01 |
| Comfort | 3.10 (1.30) | 2.96 (1.26) | 3.28 (1.36) | -0.78 | .02 |
| Total Affect | 25.51 (21.04) | 23.22 (17.55) | 28.44 (25.04) | -0.79 | .02 |
| Positive Affect | 8.99 (11.20) | 6.29 (9.84) | 12.44 (12.12) | -1.80 | .08 |
| Negative Affect | 10.90 (12.42) | 11.34 (11.96) | 10.33 (13.32) | 0.25 | .00 |
| Undefined Affect | 5.63 (6.53) | 5.59 (5.97) | 5.67 (7.36) | -0.04 | .00 |
| Variety of Affect | 4.46 (2.95) | 4.52 (2.98) | 4.39 (2.99) | 0.14 | .00 |
| MSFM | | | | | |
| Fluency | 17.29 (5.74) | 15.87 (5.69) | 19.11 (5.42) | -1.85 ⁺ | .08 |
| Novelty | 4.10 (2.61) | 3.65 (2.21) | 4.67 (3.01) | -1.25 | .04 |
| Storytelling Creativity | 3.10 (1.08) | 2.89 (1.08) | 3.37 (1.04) | -1.44 | .05 |

^an = 41, ^bn = 23, ^cn = 18

⁺p < .08, two-tailed. df = 39

APS-P: Affect in Play Scale-Preschool version

MSFM: Multidimensional Stimulus Fluency Measure

η^2 =Eta-squared

*Effect size (Cohen, 1988):

.01=Small

.06=Medium

.14=Large

Table 2: Baseline Partial Correlations Controlling for Age among Pretend Play, Divergent Thinking, and Creative Storytelling ^a

| APS-P ^b | MSFM | | | |
|-------------------------|------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| | Age ^c | Fluency ^b | Novelty ^b | Storytelling Creativity ^b |
| Pretend Play | .31 ⁺ | .23 (.21) | .33* (.33*) | .27 ⁺ (.32*) |
| No Play | -.25 | -.17 (-.16) | -.28* (-.29*) | -.18 (-.23 ⁺) |
| Imagination | .36* | .25 ⁺ (.23 ⁺) | .27 ⁺ (.26 ⁺) | .31* (.37**) |
| Organization | .35* | .35* (.32*) | .37* (.36*) | .40** (.45**) |
| Elaboration | .39* | .29* (.25 ⁺) | .32* (.30*) | .31* (.38**) |
| Comfort | .40* | .25 ⁺ (.22) | .32* (.31*) | .35* (.42**) |
| Total Affect | .36* | .22 (.20) | .33* (.32*) | .22 (.29*) |
| Positive Affect | .29 ⁺ | .32* (.29*) | .23 (.23 ⁺) | .33* (.38**) |
| Negative Affect | .22 | .07 (.06) | .19 (.19) | .07 (.13) |
| Undefined Affect | .27 | .01 (.00) | .28* (.28*) | -.02 (.05) |
| Variety of Affect | .25 | .27 ⁺ (.26 ⁺) | .40** (.39**) | .28* (.32*) |
| Storytelling Creativity | -- | .38* (.36*) | .27 ⁺ (.26*) | -- |

^a Correlations with Age computed with two-tailed tests of significance. All other correlations computed with one-tailed tests of significance. Numbers in () are zero-order correlations without controlling for age.

^b n = 41

^c n = 38

⁺ p < .08, *p < .05, **p < .01

APS-P: Affect in Play Scale-Preschool version

MSFM: Multidimensional Stimulus Fluency Measure

Table 3: Hierarchical Multiple Regressions of Pretend Play Predicting Creativity

| Creativity Variable | Predictors | ΔR^2 | ΔF | Unstandardized Beta (<i>B</i>) | Standardized Beta (β) | <i>t</i> |
|-------------------------|-----------------------|--------------|-------------------|----------------------------------|-------------------------------|----------|
| MSFM Fluency | Step 1: Age | .001 | 0.03 | | | |
| | Step 2: | .15 | 3.08 ⁺ | | | |
| | APS-P Organization | | | 1.14 | 0.27 | 1.42 |
| | APS-P Positive Affect | | | 0.11 | 0.21 | 1.10 |
| MSFM Novelty | Step 1: Age | .001 | 0.04 | | | |
| | Step 2: | .15 | 3.09 ⁺ | | | |
| | APS-P Organization | | | .54 | .28 | 1.31 |
| | APS-P Total Affect | | | .02 | .18 | 0.82 |
| Storytelling Creativity | Step 1: Age | .06 | 2.46 | | | |
| | Step 2: | .17 | 3.77 [*] | | | |
| | APS-P Organization | | | 0.25 | 0.32 | 1.75 |
| | APS-P Positive Affect | | | 0.02 | 0.18 | 1.01 |

⁺ $p < .08$, ^{*} $p < .05$

APS-P: Affect in Play Scale-Preschool version

MSFM: Multidimensional Stimulus Fluency Measure

Table 4: Repeated Measures ANOVA for Play Intervention Effects

| APS-P | Baseline ^a | | Outcome ^b | | Sig. | Effect Size |
|-------------------------|------------------------------------|--------------------------|------------------------------------|--------------------------|---------------------|------------------|
| | Play Intervention <i>M (SD)</i> | Control <i>M (SD)</i> | Play Intervention <i>M (SD)</i> | Control <i>M (SD)</i> | | |
| Pretend Play | 8.45 (5.33) | 9.32 (4.73) | 9.95 (4.35) | 9.81 (4.51) | F = 0.47 p = .50 | $\eta_p^2 = .01$ |
| No Play | 2.53 (4.74) | 2.45 (4.79) | 0.30 (0.57) | 1.33 (3.47) | F = 0.89 p = .35 | $\eta_p^2 = .02$ |
| Imagination | 2.90 (1.29) | 3.14 (1.39) | 3.50 (1.24) | 3.62 (1.36) | F = 0.10 p = .75 | $\eta_p^2 = .00$ |
| Organization | 2.90 (1.41) | 3.05 (1.36) | 3.40 (1.23) | 3.24 (1.14) | F = 1.36 p = .25 | $\eta_p^2 = .03$ |
| Elaboration | 2.50 (1.10) | 2.86 (1.20) | 3.10 (0.97) | 3.19 (1.21) | F = 0.96 p = .33 | $\eta_p^2 = .02$ |
| Variety of Affect | 4.15 (3.36) | 4.76 (2.55) | 5.25 (2.65) | 5.62 (2.97) | F = 0.10 p = .75 | $\eta_p^2 = .00$ |
| Positive Affect | 8.08 (11.02) | 9.85 (11.57) | 11.20 (11.97) | 9.00 (10.66) | F = 2.15 p = .15 | $\eta_p^2 = .05$ |
| Negative Affect | 10.60 (12.11) | 11.18 (13.00) | 9.35 (7.13) | 11.52 (8.92) | F = 0.68 p = .68 | $\eta_p^2 = .00$ |
| Undefined Affect | 4.73 (6.61) | 6.48 (6.50) | 6.75 (6.71) | 9.67 (9.03) | F = 0.19 p = .67 | $\eta_p^2 = .01$ |
| MSFM | | | | | | |
| Fluency | 17.35 (6.29) | 17.24 (5.32) | 17.30 (6.67) | 14.38 (4.15) | F = 1.62 p = .21 | $\eta_p^2 = .04$ |
| Novelty | 4.45 (2.98) | 3.76 (2.21) | 5.10 (4.34) | 3.62 (2.20) | F = 0.48 p = .49 | $\eta_p^2 = .01$ |
| Storytelling Creativity | 2.81 (1.11) | 3.14 (1.13) | 2.87 (1.17) | 3.38 (1.05) | F = 0.32 p = .58 | $\eta_p^2 = .01$ |

^a n = 41^b n = 41 for APS-P and MSFM variables, n = 40 for Storytelling Creativity

APS-P: Affect in Play Scale-Preschool version

MSFM: Multidimensional Stimulus Fluency Measure

η_p^2 = Partial eta-squared

Table 5: Means and Standard Error of Change Variables for MANOVA

| | Intervention | Control |
|-----------------------------|--------------|--------------|
| | Mean (SE) | Mean (SE) |
| Change in Pretend Play | 1.50 (1.05) | 0.49 (1.02) |
| Change in Imagination | 0.60 (0.28) | 0.48 (0.27) |
| Change in Organization | 0.50 (0.19) | 0.19 (0.19) |
| Change in Elaboration | 0.60 (0.19) | 0.33(0.19) |
| Change in Positive Affect | 3.12 (1.94) | -0.85 (1.89) |
| Change in Variety of Affect | 1.10 (0.55) | 0.86 (0.54) |

n = 41