

THE DEVELOPMENT OF CREATIVITY

by

CANDICE MICHELLE MOTTWEILER

A DISSERTATION

Presented to the Department of Psychology
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

September 2017

DISSERTATION APPROVAL PAGE

Student: Candice Michelle Mottweiler

Title: The Development of Creativity

This dissertation has been accepted and approved in partial fulfillment of the requirements for the Doctor of Philosophy degree in the Department of Psychology by:

Marjorie Taylor	Chairperson
Lou Moses	Core Member
Heidemarie Laurent	Core Member
Ben Saunders	Institutional Representative

and

Scott L. Pratt	Dean of the Graduate School
----------------	-----------------------------

Original approval signatures are on file with the University of Oregon Graduate School.

Degree awarded September 2017

© 2017 Candice Michelle Mottweiler

DISSERTATION ABSTRACT

Candice Michelle Mottweiler

Doctor of Philosophy

Department of Psychology

September 2017

Title: The Development of Creativity

While there is evidence of early creativity in children's colorful drawings, original stories, and elaborate games of pretense, conducting research on the topic of children's creativity can be challenging. In particular, the most commonly used measures of creativity have been shown to be problematic, particularly with young children.

Therefore, an important goal of this dissertation was to develop appropriate laboratory tasks for assessing children's creativity. At Time 1, 75 4- and 5-year-old children (38 boys, 37 girls) were asked to complete two new measures of creativity – a storytelling task and a drawing task. In addition, the children were interviewed about whether they engaged in elaborated role play (i.e., pretending in which children imagine and act out the part of a character on a regular basis). The results indicated that the laboratory measures of creativity were both related to engaging in elaborated role play as well as related to each other (independent of age and language ability), suggesting that the measures were effective in assessing young children's creativity, and that they were specifically associated with elaborated role play.

Another goal of this dissertation was to examine the continuity of individual differences in creativity from preschool age to middle school age with a longitudinal follow-up assessment of the children from Time 1 approximately eight years later when

they were 11 to 14 years old. 41 children (21 boys, 20 girls) participated at Time 2 and completed a large battery of creativity measures, including tasks similar to the laboratory measures at Time 1 as well as additional measures that varied in whether they included social content. Contrary to hypotheses, laboratory measures of creativity at Time 1 did not predict any of the measures of creativity at Time 2. However, the creativity ratings of the role play characters from Time 1 were related to all of the indicators of creativity eight years later. In addition, having an imaginary companion at Time 2 was concurrently related to several measures of creativity. These results suggest that elaborated role play might be particularly relevant for children's developing creativity.

This dissertation includes previously published co-authored material.

CURRICULUM VITAE

NAME OF AUTHOR: Candice Michelle Mottweiler

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene, OR
Lane Community College, Eugene, OR

DEGREES AWARDED:

Doctor of Philosophy, Psychology, 2017, University of Oregon
Master of Science, Psychology, 2010, University of Oregon
Bachelors of Arts, Psychology, 2008, University of Oregon

AREAS OF SPECIAL INTEREST:

Creativity
Pretend Play
Coping and Resilience

PROFESSIONAL EXPERIENCE:

Clinical Psychology Intern, Kansas University School of Medicine-Wichita,
2016-2017

Clinician, Oregon Community Programs, 2015-2016

Graduate Teaching Fellow, University of Oregon, 2009-2010, 2014-2016

Clinician, University of Oregon Psychology Clinic, 2010-2015

Clinician, Oregon Social Learning Center, 2012-2014

Graduate Research Fellow, University of Oregon, 2013-2014

GRANTS, AWARDS, AND HONORS:

Co-Principal Investigator, Children's Imaginary Worlds and the Development of Creativity and Moral Judgment, The John Templeton Foundation, \$265,190, 2012-2015

National Science Foundation Graduate Research Fellowship, National Science Foundation, 2010-2013

Honors in Psychology, University of Oregon, 2008

PUBLICATIONS:

Mottweiler, C.M. (2015). Using narratives and drawings to assess creativity in preschool-age children. In S. Douglas (Ed.), *Children's Play, Pretence, and Story: Studies in Culture, Context, and ASD*.

Mottweiler, C.M. & Taylor, M. (2014). Elaborated role play and creativity in preschool age children, *Psychology of Aesthetics, Creativity, and the Arts*, 8, 277-286.

Shawber-Sachet, A.B. & Mottweiler, C.M. (2013). Pretend play and the development of imagination: The distinction between role play substitution and object substitution. In M. Taylor (Ed.) *Oxford Handbook of the Development of Imagination*. Oxford, UK: Oxford University Press.

Taylor, M., Mottweiler, C. M., Naylor, E. R., & Levernier, J. G. (2015). Imaginary worlds in middle childhood: A case study of two pairs of coordinated paracosms. *Creativity Research Journal*.

Taylor, M., & Mottweiler, C.M. (2008). Imaginary companions: Pretending they are real but knowing they are not. *American Journal of Play* 1(1), 47-54

ACKNOWLEDGMENTS

I am extremely grateful to my advisor, Marjorie Taylor, for her support, guidance, and encouragement throughout my graduate career - I am forever thankful. I am also very grateful to Lou Moses, Heidemarie Laurent, and Ben Saunders for their support and valuable advice on my dissertation. Many thanks to the members of the Imagination Lab, past and present, for all their help in making this research possible and the laughter that we have shared over the years. I am thankful to all of the families who volunteered their time to participate in this research. Finally, I could not have done this work without the support of my amazing family, friends, and fellow graduate students.

This research was supported by a National Science Foundation Graduate Fellowship. In addition, grant funding was provided by The Templeton Foundation in support of this research.

To my daughter Addy, who inspires me every day with her imagination and creativity.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION	1
Defining Creativity	2
Development of Creativity.....	3
Domains of Creativity.....	6
Measuring Creativity	8
Self Report	9
Teacher Report.....	10
Observations of Creativity	10
Divergent Thinking Tasks.....	11
Criticisms of Divergent Thinking Tasks.....	12
Criticisms of Divergent Thinking Tasks for Young Children	14
Consensual Assessment Technique	16
Pretend Play	17
Summary	19
II. ELABORATED ROLE PLAY AND CREATIVITY IN PRESCHOOL AGE CHILDREN	21
Introduction.....	21
Method	24
Participants.....	24
Procedure	25
Elaborated Role Play.....	25

Chapter	Page
Child Role Play Interview.....	25
Parent Role Play Questionnaire	26
Follow-up Interviews	26
Coding of Elaborated Role Play	27
Pretend Play Development.....	29
Narrative Creativity Task.....	29
Drawing Creativity Task.....	31
Language Ability	32
Narrative Structure.....	34
Data Analysis	34
Results.....	35
Elaborated Role Play.....	35
Creativity.....	38
Are Children Who Engage in Elaborated Role Play More Creative Than Other Children?.....	39
Discussion.....	42
III. THE DEVELOPMENT OF SOCIAL CREATIVITY: A FOLLOW-UP STUDY	45
Introduction.....	45
Measurement of Creativity	45
Creativity in and out of the Laboratory.....	48
Coping and Psychological Adjustment.....	50

Chapter	Page
Executive Functioning	51
Method	53
Participants.....	53
Time 2 Procedure and Measures.....	54
Creativity Measures	55
Narrative Creativity Task.....	55
Drawing Creativity Task.....	57
Collage Creativity Task	58
Unusual Uses Task.....	60
Tails Consequences Divergent Thinking Task	63
Making Friends Divergent Thinking Task.....	64
Imaginary Companion Interview	64
Paracosm Interview.....	66
Measures of Coping and Psychosocial Adjustment.....	68
Children’s Coping Strategies Checklist.....	68
Strengths and Difficulties Questionnaire	70
Autism Spectrum Quotient: Children’s Version.....	70
The Grit Scale	71
Measures of Executive Functioning and Verbal Comprehension.....	71
Flanker Task	71
Trail Making Test	73
Digit Span	73

Chapter	Page
Peabody Picture Vocabulary Test.....	73
Results.....	74
Creativity.....	74
Imaginary Companions.....	77
Paracosms	80
Longitudinal Analyses	81
Coping and Psychosocial Adjustment	82
Executive Functioning	87
Correcting for Multiple Analyses	88
Discussion	88
Creativity.....	88
Longitudinal Analyses	94
Psychosocial Adjustment and Coping	95
Executive Functioning	96
Conclusion	97
IV. GENERAL DISCUSSION.....	98
Measuring Creativity	98
Correlates of Creativity.....	101
Pretend Play	101
Coping and Psychosocial Adjustment	103
Executive Functioning	104
The Development of Creativity	105

Chapter	Page
Paracosms	108
Limitations	109
Future Directions	110
Conclusion	112
APPENDICES	114
A. TIME 1: CHILD ROLE PLAY INTERVIEW	114
B. TIME 1: PARENT ROLE PLAY QUESTIONNAIRE	116
C. TIME 2: CHILD IMAGINARY COMPANION INTERVIEW	119
D. TIME 2: CHILD PARACOSM INTERVIEW	120
E. TIME 2: CHILDREN’S COPING STRATEGIES CHECKLIST	124
F. TIME 2: PARENT IMAGINARY COMPANION AND PARACOSM QUESTIONNAIRE	126
G. TIME 2: STRENGTHS AND DIFFICULTIES QUESTIONNAIRE	130
H. TIME 2: AUTISM SPECTRUM QUOTIENT: CHILDREN’S VERSION	132
I. TIME 2: THE GRIT SCALE	134
J. TIME 2: TRAIL MAKING TEST	135
REFERENCES CITED	139

LIST OF FIGURES

Figure	Page
1. Examples of Children's Response for the Drawing Task.....	33
2. Examples of Children's Response for the Drawing Task at Time 2.....	59
3. Examples of Children's Collages at Time 2	61

LIST OF TABLES

Table	Page
1. Examples of Children’s Story Stem Completions	31
2. Examples of Children’s Elaborated Role Play.....	36
3. Means, Standard Deviations, and the Range of Scores as a Function of Elaborated Role Play.....	37
4. Correlations among Measures of Developmental Abilities and Creativity Measures	40
5. Examples of Children’s Story Stem Completions at Time 2.....	57
6. Examples of Children’s Imaginary Companions at Time 2.....	67
7. Descriptions of Children’s Paracosms at Time 2.....	69
8. Creativity Measure Means, Standard Deviations, and Range of Scores.....	75
9. Correlations among Creativity Measures at Time 2 (Controlling for Gender, Age, and Verbal Comprehension).....	76
10. Frequencies of Imaginary Companions (IC) for Children Who Participated at Time 1 and Time 2.....	79
11. Creativity Measure Means and Standard Deviations as a Function of Having an Imaginary Companion (IC).....	80
12. Creativity Measure Means and Standard Deviations as a Function of Having a Paracosm	81
13. Correlations between Measures of Creativity at Time 1 and Time 2 (Controlling for Gender, Age, and Verbal Comprehension)	82
14. Coping and Psychosocial Adjustment Means, SDs, and Range of Scores	84
15. Correlations among Psychosocial Adjustment and Coping Measures (Controlling for Gender, Age, and Verbal Comprehension)	85
16. Correlations between Measures of Creativity and Psychosocial Adjustment and Coping (Controlling for Gender, Age, and Verbal Comprehension).....	86

Table	Page
17. Executive Function Means, Standard Deviations, and Range of Scores	87
18. Correlations among Measures of Executive Functioning (Controlling for Gender, Age, and Verbal Comprehension).....	88
19. Correlations between Measures of Executive Functioning and Creativity Measures (Controlling for Gender, Age, and Verbal Comprehension).....	89

CHAPTER I

INTRODUCTION

Creativity is a multifaceted and at times paradoxical construct that underlies many of our most highly valued achievements. Questions about what creativity is, where it comes from, how to identify it, and how to potentially harness or foster it have been considered from a range of perspectives across numerous disciplines (see Sawyer, 2012, for a review). Psychologists generally focus on one or more of Rhodes' (1961) “4 Ps” of creativity: *person*, *process*, *press*, and *product* (Runco, 2004). *Person* refers to personality traits or characteristics of creative individuals (e.g., curiosity, flexibility); *process* refers to what is occurring, often at the cognitive level, when a person is behaving creatively (e.g., associative processes of creative thought, moments of insight); *press* refers to environmental or contextual features that might influence creativity (e.g., encouragement from others, availability of necessary resources); and *product* refers to the outcomes produced during the creative process, including concrete objects (e.g., artwork, a written story) as well as more abstract products (e.g., an idea, a symbol system, a process for completing a task).

In this dissertation, I have explored creativity through the lens of creative products, focusing on the development of creativity in children. In Chapter 2, I describe a previously published study (Mottweiler & Taylor, 2014) with preschool-age children in which I developed two laboratory measures of creativity and examined how these were related to children's role play behaviors (e.g., interactions with imaginary companions). In Chapter 3, I describe a follow-up study with the children from this initial study (Time 1) who participated eight years later when they were 11 to 14 years old (Time 2) to

examine the ways in which early indicators of creativity are related to later performance on laboratory measures of creativity as well as other imaginative activities outside the laboratory.

Defining Creativity

The most widely accepted definition of creativity among psychologists involves the creation of *novel* and *appropriate* products. Although novelty (i.e., being original, unique, or unexpected) is necessary for a product to be judged as creative, it is not sufficient because it does not control for odd, bizarre, or meaningless ideas that have little value. Therefore, *appropriateness* is also required; a creative product must be successful in generating a solution for a given problem and be valued for its usefulness or effectiveness. The criterion of appropriateness varies greatly as a function of the goals for a given product or project. For example, in fine art, the aesthetic appeal or the emotional experience of a viewer might be important; whereas in business, increased profits might be an indicator of appropriateness.

The definition of creativity as the intersection of novelty and appropriateness has been applied to products along a wide continuum, from the masterpieces of history to clever solutions for everyday problems. However, there is debate over how broad or narrow the scope of creativity research should be. For example, Csikszentmihalyi's (1996) research focuses on individuals who are experts in their domains from years of training and experience and who have produced innovations that are new and valuable to *the world* or that have revolutionized their fields. In his model of so-called "Big C" creativity, learning what has come before in a domain is considered crucial for finding one's own unique and creative direction. Wallas (1926) also emphasized the importance

of preparation in the creative process as a prerequisite for creative accomplishments in his stage model of creativity. According to Simon and Chase (1973), it takes at least ten years of preparation within a field (e.g., training, education) in order to develop expertise that can then be employed in the service of generating creative ideas.

While models of “Big C” creativity are useful for identifying the characteristics of world-class creators (e.g., Steve Jobs, George Lucas, J. K. Rowling), many psychologists are more interested in the creativity that is evident in everyday human behavior. This level of creativity – “little c” creativity – involves the formation of ideas that have not been considered previously by *the self* (rather than by society at large) and are typically innovations in generating solutions for everyday problems (Kaufman & Beghetto, 2009; Runco, 1996). “Little c” creativity can be studied in the laboratory using behavioral measures, which make it possible to approach questions about individual differences in creativity and how these relate to other behaviors and aspects of life.

Development of Creativity

An additional benefit of the “little c” perspective is that it allows for the study of creativity in early childhood, a possibility that is essentially ruled out by a “Big C” focus on creative achievements that are recognized as major contributions within a field. In my opinion, focusing solely on the developmental story of “Big C” creativity – creativity that involves many years to obtain – limits our understanding of the phenomena. While society might not benefit from a child’s masterpiece, young children frequently generate products that are new and interesting to themselves and to others in their lives. In fact, the theory that children are especially creative – the opposite of a “Big C” view – has a long history, dating to the 18th century Romantic period in Great Britain. During that

time, an idealized image of childhood as a time filled with unbridled curiosity became popularized. Early contributors to this perspective (including poets William Wordsworth and William Blake and philosopher Jean-Jacques Rousseau) regarded childhood as a period of innocence and imagination, inherently close to nature and therefore uncorrupted by the problems of society (see Austin, 2003). Children were considered superior to adults in the ease with which they were able to access their imaginations and creativity. Wordsworth (1921) described the adult pining to recapture these innate abilities of childhood imagination as “The things which I have seen I now can see no more” (p. 609).

In contemporary developmental psychology, there are echoes of this perspective in theories that view childhood as a time of enhanced creative potential. For example, Runco (1999) has speculated that children might be more able to think creatively than adults because they are less constrained by experiences that impose conventions, assumptions, and rules leading to inflexibility and rigidity, therefore allowing them to freely explore possibilities and generate ideas. From this view, adults are seen as constrained by the boundaries of what they know to be true, thus limiting their ability to consider novel solutions to a problem.

I am sympathetic to the suggestion that some characteristics of childhood are beneficial to creative thought, and am of the opinion that even young children are capable of “little c” creativity. However, the research evidence is most consistent with a slowly increasing capacity for creativity with age rather than the reverse (Kleibecker, Dreu, & Crone, 2013; Lau & Cheung, 2010). This improvement is likely due to increases in knowledge, general skills, and life experience that make it possible to more successfully meet the demands of a given task, including creativity tasks. However, the findings from

several longitudinal and cross-sectional studies also suggest that the developmental progression of creativity does not necessarily follow a simple and straightforward linear trajectory towards increased creativity. Torrance (1968) first identified what is often referred to as the "fourth grade slump" in creativity, during which many children demonstrate decreased performance on a measure of creativity in the fourth grade relative to earlier (third grade) and later (fifth grade) performance. Some later studies have replicated this result with other samples of children during these same ages (Charles & Runco, 2001).

One explanation for these slumps has pointed to changes related to cognitive development, suggesting that during periods of development when children are more conventional and literal, they are also more likely to be rigid and inflexible in their thinking, which is believed to inhibit creativity (Garner, 1982). However, other studies have found opposing results that indicate contrasting slumps (e.g., ages 7 and 12) as well as peaks (e.g., ages 10 and 16) suggesting that slumps in performance on creativity measures are not simply a function of cognitive development (Claxton, Pannells, & Rhoads, 2005; Smith & Carlsson, 1990). Instead, these researchers suggest that social and cultural expectations within a child's environment might lead to creativity slumps and peaks at different ages. For example, if a child's culture has a higher expectation for children to follow rules at certain ages, this might lead children to become more rule-bound and rigid with the consequence of decreased creativity. Runco (1999) also points out the individual differences within these studies – even within Torrance's classic study – a large proportion of children showed steady, linear increases in performance on creativity measures across time, while other children demonstrated no improvements over

the two years. Runco argues that there are individual differences in creativity trajectories, with slumps and peaks in creativity present at different ages for different individuals for a variety of reasons.

In summary, when performance on creativity measures is examined under a close lens over shorter periods of time, peaks and slumps often appear. However, when the lens is moved further out over longer periods of time (i.e., several years), creativity appears to follow a general increase with age which might reflect some continuous process that underlies the development of creativity (e.g., Claxton, Pannells, & Rhoads, 2005; Smith & Carlsson, 1990). While these findings are interesting, it is important to note that most studies that have examined developmental changes in creativity have relied on measures that have been recently criticized (as discussed in the following sections), suggesting that differences could be due in part to the way creativity is assessed in the laboratory and children's changing capacity to respond to task demands (Dziedziewics et al., 2013; Tegano et al., 1986).

In this dissertation, rather than attempt to examine whether children generally become more or less creative at different points in development, the goal was to explore the developmental continuity or consistency of creativity. Is a preschooler's creativity limited to amusing behaviors that are inconsequential for later creativity? Or do the children who appear to be the most creative during these early years continue to present as more creative among their peers several years later?

Domains of Creativity

Some researchers believe that creativity results from a general cognitive process or ability that cuts across domains (Ward, Smith, & Finke, 1999), whereas other

researchers hold the view that creativity tends to be specific to a particular domain or field (e.g., science, arts, business), such that creativity in one domain does not predict creativity in another (Baer, 1998). Empirical evidence on this topic has not provided consistently strong support for either position. Studies that are interpreted as supporting a domain-specific perspective by demonstrating null correlations between creativity in some domains, also typically find moderate correlations between creativity in other domains (Baer, 1991; Han & Marvin, 2002; Han, 2003). Studies that are interpreted as supporting a more domain-general perspective by demonstrating correlations between tasks that represent different domains often also find that the strongest correlations are within domain (Conti, Coon, & Amabile, 1996; Chen, Himsel, Kasof, Greenberger, & Dmitrieva, 2006). Many researchers hold a less polarized view, considering individuals to have a general capacity to generate creative ideas that is then developed in specific domains as a function of interests and education (Kaufman, Cole, & Baer, 2009; Plucker & Beghetto, 2004; Simonton, 2007).

Overall, it is likely that some components of creativity are domain specific while other features cut across domains, with generality and specificity shifting somewhat depending on how creativity is defined. For example, in order to generate an innovation that revolutionizes a field (i.e., "Big C" creativity), one likely has a high level of training and experience in the given field that is not present for other fields, making this type of creativity more domain specific. On the other hand, the ability to develop clever solutions for everyday problems (i.e., "little c" creativity) requires little expertise and is often as much an act of discovering as it is an act of creating, which is more consistent with a domain general perspective.

The domains of creativity that have historically received the most attention include visual arts, literature, music, sciences, and mathematics with several studies examining the ways in which these domains are different (see Sawyer, 2012). Recently, I have become particularly interested in a domain that has received less attention – social creativity. This form of creativity involves the generation of new and effective solutions to social problems, from everyday situations (e.g., making new friends, avoiding an argument) to larger issues (e.g., public policies regarding equal rights, the global economy; Jalongo & Hirsh, 2012; Mouchiroud & Lubart, 2002). However, measures of creativity rarely include any social content, instead focusing on the manipulation of physical objects (e.g., uses for a brick). Mouchiroud and Lubart (2002) argue that this reliance on creativity measures oriented toward the physical world while neglecting the social world has resulted in a loss of information about the broader construct of creativity.

Recent research findings from our lab provide some support for the claim that social creativity is a distinct domain of creativity (Taylor et al., in prep). Using a battery of creativity measures that varied in whether they included social content, we found that the measures with social content had a differential pattern of results from measures that did not, suggesting that social content adds a meaningful dimension in understanding creativity. One of the goals of this dissertation was to explore whether measures including social content early in childhood would be differentially predictive of performance on later measures with social content.

Measuring Creativity

No single assessment tool (or battery of tools for that matter) will likely ever be able to fully capture the construct of creativity in all of its complexity, but an ongoing goal of research in this area is to identify techniques that successfully capture some aspect of creativity or creative potential in hopes of understanding this important capacity. Although experts generally agree that creativity involves novelty and appropriateness, how to best operationalize and measure creativity is far from resolved and when children are the population of interest, additional factors have to be taken into consideration. Below is a review of some of the methods used for measuring children's creativity, including self-report, teacher report, and various behavioral tasks. The strengths and weaknesses of these methods are discussed, with an emphasis on divergent thinking tasks, which are the most commonly used measures of creativity, and the consensual assessment technique, which has particular advantages for research with young children.

Self report. In self-report measures of creativity, school-age children are asked questions that are used to identify creative activities and achievements. For example, the Creative Activities Checklist (Runco, 1987) is a self-report measure that asks children to indicate how often they participate in various activities considered creative, including literature, music, drama, arts, crafts, and science. A major limitation of self-report measures is that they rely on the insight of the individual to recognize and accurately report on his or her behaviors. Children are often poor informants of their skills and the frequencies of their various activities. The issue of accuracy, in addition to children's limited creative accomplishments, make this a problematic method for assessing children's creativity.

Teacher report. Some measures involve asking teachers to rate their students on characteristics of creativity, such as the frequency of individual students' overall creative behavior (Li, Poon, Tong, & Lau, 2013). Other measures, such as Barnett's (1990) Children's Playfulness Scale, ask teachers to rate students on characteristics considered important for creativity, such as physical spontaneity, social spontaneity, cognitive spontaneity, sense of humor, and manifest joy. One of the benefits of this approach is that teachers have experience with many different children, giving them a basis for judging children's varying abilities and limitations. However, some research indicates that teachers' ratings might be influenced by the halo effect (i.e., some children are seen as better across domains), causing children's likeability or intelligence to affect ratings of creativity (see Karwowski, Gralewski, Lebuda, & Wisniewska, 2007). While teacher reports of creativity shed light on how children's creativity is perceived by adults, the biases of these ratings limit their utility for other purposes. Observing children's actual behavior is an important way to overcome this limitation.

Observations of creativity. In several qualitative studies, researchers have closely observed the creative behaviors of children in naturalistic settings, such as preschools (Holmes & Geiger, 2002; Robson & Rowe, 2012; Trawick-Smith, Russell, & Swaminathan, 2011). For example, Cremin, Chappell, and Craft (2013) examined the qualitative stories generated by preschool children and identified inclusions of fantastical or "what-if" content within their narratives. One of the general findings of this methodology is that even very young children demonstrate behaviors indicative of creative thought, such as the inclusion of invented characters, unique settings, and plot twists that are novel to the child. But while these studies provide rich descriptions, it is

difficult to employ quantitative methods or analyses with products that are so diverse. In order to complement the findings of qualitative research, it is important to employ creativity measures that are standardized and thus allow comparison of responses across children.

Divergent thinking tasks. Divergent thinking tasks are by far the most commonly-used measures for assessing creativity across age groups (Runco, Dow, Smith, 2006; Torrance, 2000). Divergent thinking is defined as the ability to flexibly generate numerous possibilities and identify remote associates. This ability has been deemed by many psychologists as particularly important for creativity and is therefore routinely used as a measure of creative ability or potential (see Silvia et al, 2008; Torrance, 1974). In divergent thinking tasks, participants are asked to generate as many solutions as they can for a given problem. For example, in the unusual uses task, individuals are asked to generate as many uses as possible for an everyday object, such as a brick or newspaper. In a less verbally demanding divergent thinking task, participants are shown a drawing of a simple figure and are asked to complete the drawing in as many distinct ways as they can.

There are other variations of divergent thinking tasks, but the scoring is fairly consistent across measures with “uniqueness” as the primary variable of interest. Uniqueness is calculated by first identifying the number of solutions a participant generated for the task (fluency) and then determining how many of those solutions are not mentioned by other participants in the study (uniqueness; Wallach & Kogan, 1965). Fluency is also used to a somewhat lesser extent as an indicator of creativity, however it usually is less emphasized, particularly as it has been shown to be highly correlated with

verbal fluency (see Silvia et al., 2008). There are also some variations on these scoring methods that are sometimes used. For example, instead of only counting responses generated by one participant in a sample as unique, a response generated by a certain percentage (e.g., 5%) of the sample is sometimes incorporated as an indicator of uniqueness. Also, it is not uncommon for researchers to code for additional variables. For example, Torrance's (1974) Tests of Creative Thinking (the most widely-used battery of divergent thinking) examine, in addition to uniqueness and fluency, *flexibility* (the number of different categories of responses that are included) and *elaboration* (the detail and specificity incorporated into the response). The Multidimensional Stimulus Fluency Measure sorts responses as either *popular* or *original*, and then sums each (Tegano, Moran, Godwin, 1986), while the Tel Aviv Creativity Test identifies the number of generated ideas that are both unusual and high in quality (Milgram and Milgram, 1976).

The interpretation of the scores is straightforward: the greater the number of unique ideas generated and (to a lesser degree) the greater the fluency, the higher the individual's creativity. Ease in scoring and relative objectivity are often cited as reasons in favor of divergent thinking tasks and could account in part for the heavy usage of these types of tasks.

Criticisms of divergent thinking tasks. Divergent thinking measures have been criticized in recent years as having a number of limitations. One problem is that while they might identify ideas that are *novel*, the *appropriateness* of ideas is generally neglected, despite appropriateness being a fundamental criterion of creativity (Zeng, Proctor, & Salvendy, 2011). Random, bizarre, and even ordinary responses are often included as unique, even though they might not otherwise be considered creative (Silvia

et al., 2008). Some researchers have attempted to rate the appropriateness of ideas (Milgram & Milgram, 1976; Runco & Charles, 1993; Silvia, 2008), however appropriateness is rarely incorporated and there are currently no standard guidelines for such coding.

Some might argue that it is not critical to include appropriateness in divergent thinking tasks, as these measures are meant to assess only *one component* of creativity (Runco, 2008). However, this distinction is generally ignored in practice, with divergent thinking frequently being considered synonymous with creativity. This practice is particularly problematic as some studies have suggested that divergent thinking might not even be relevant for creativity in the real world (Weisberg, 2006). Rather, it has been argued that a single good idea that has been developed over time is likely to be more valuable for its creative contribution than numerous mediocre ideas. This argument is further supported by the finding that while some studies have shown divergent thinking tasks to predict creative achievement (Runco, Millar, Acar, & Cramond, 2010), many other studies have not found divergent thinking to predict creative behaviors outside the laboratory (Barron & Harrington, 1981; Zeng, Proctor, Salvendy, 2011; see Sawyer, 2012 for a review). In addition, there are criticisms regarding the psychometric properties of divergent thinking tasks. For example, Silvia et al. (2008) point out that uniqueness scoring penalizes using large samples for data collection, such that the larger the sample size, the smaller the likelihood that a given answer will be considered unique.

Despite the various concerns about divergent thinking tasks, they continue to be the most commonly used measures of creativity and are typically interpreted as indicators of global creativity. This practice reduces a complex construct with multiple factors to a

single cognitive ability, with research findings leading to beliefs about creativity which could be incorrect or incomplete.

Criticisms of divergent thinking tasks for young children. The general limitations of divergent thinking tasks warrant caution in using and interpreting these measures. However, when divergent thinking tasks are used with young children, additional issues emerge and it is questionable whether these types of tasks are appropriate for this age group (Ward, 1968). For example, Busse, Blum, and Gutride (1972) removed the unusual uses task from their battery of creativity tasks with 3- to 5-year-old children because pilot testing indicated that the children were unable to relate to the task or give meaningful responses.

Some researchers have attempted to make tasks more engaging and relatable by including visual stimuli. For example, in the Multidimensional Stimulus Fluency Measure Patterns task children are presented with abstract three-dimensional objects and then asked to list all the different things that the objects might be (Tegan et al., 1986). In addition, some researchers have developed divergent thinking tasks that reduce the verbal demands. For example, in the Thinking Creatively in Action and Movement task, children are asked to demonstrate variations of physical movement (e.g. "how many ways can you walk across the room?"), thereby minimizing the need for verbal responses (Torrance, 1981).

Although these tasks are improvements, the adaptations do not address some core concerns regarding the use of divergent thinking tasks with young children. For instance, Smogorzewska (2012) argues that young children generally do not understand the purpose of divergent thinking tasks, which likely leads to a lack of interest or motivation

to engage in the task. This is problematic given that many researchers have heavily emphasized the importance of developing creativity measures that are fun, interesting, and easy to understand for children (Amabile, 1996; Starkweather, 1964; Wallach & Kogan, 1965). According to Starkweather (1971), the goal in designing creativity measures is “the development of a game which the child would want to play” (p. 246). Similarly, Torrance (2000) argued that, creativity measures should be natural to the experiences of young children, which is problematic for divergent thinking tasks. Identifying *all* the ways something can be used, perceived, or acted on does *not* reflect the natural experiences of young children. The unfamiliarity of this kind of request might make the task seem strange, regardless of the stimuli used. If participants have difficulty grappling the basic demands of a task, it is likely inappropriate for use.

Furthermore and possibly related, divergent thinking tasks require participants to be able to think about and consider several different possibilities to the same problem simultaneously. Research in children's counterfactual reasoning (which involves considering various alternatives to reality) suggests that generating alternatives is cognitively challenging for young children and might be too difficult for many to execute effectively (Beck, Robinson, Carroll, & Apperly, 2006; Guajardo & Turley-Ames, 2004). Therefore, tasks with similar demands, such as divergent thinking tasks, might be beyond the capabilities of younger children. It is essential that precautions are taken when determining assessments for children by taking into account skills and experiences that likely vary as a function of age and developmental level.

Based upon this review, I would argue that while divergent thinking tasks might have some utility for research with older participants, they are inappropriate for

preschool-age children. These tasks are likely strange and unfamiliar for young children, do not match their naturalistic experiences, and are likely more strongly reflective of other developing abilities, such as verbal ability, rather than creative potential. In order to understand preschool-age children's creativity, it is important to identify and develop alternative methods for assessing creativity in this age group.

Consensual assessment technique. Amabile's (1982) consensual assessment technique overcomes many of the above-mentioned problems with divergent thinking tasks. In this approach, participants are asked to complete an open-ended task that involves generating a product without the need for any specialized skills (e.g., create a collage, tell a story). The completed products are then assessed for creativity by appropriate judges who have some basic knowledge about the products being rated. Judges are not provided with specific criteria or a definition of creativity, but rather are asked to use their own definitions and ideas about creativity as they rate the creativity of the products on a Likert scale. Amabile argues that measuring creativity in this way is valid because the method is similar to how creativity is assessed in the real world. In addition to face validity, the consensual assessment technique gets around potentially incomplete definitions of creativity or an overemphasis on specific components by not defining creativity, per se. Arguably, a subjective rating of creativity takes into account all the aspects of creativity that are meaningful for a judge. This approach would be problematic if judges held wildly different perspectives of creativity. However, the consensual assessment technique tends to produce highly reliable scores across judges, indicating that individuals tend to agree about what is creative (Amabile, 1996). Another benefit is that this method does not suffer from some of the problems of scoring

uniqueness (e.g., including bizarre or ordinary ideas as unique) and fluency (e.g., potential confounds with verbal ability). Instead of generating multiple responses, the participant decides on an approach to the problem and then develops a single solution that can be judged for creativity.

The consensual assessment technique can also be useful in developing creativity measures for young children. This method flexibly allows for a large range of tasks, such as activities that are familiar to children and can be easily adapted. For example, drawing and storytelling are activities that are fun and interesting for most young children. These activities are also readily understandable for children as they have likely encountered these activities numerous times before. Also, given that these activities are part of the natural experiences of early childhood, it is unlikely that they require cognitive skills that are beyond the average preschooler's abilities.

Pretend Play

In addition to storytelling and drawing, children express their creativity in their pretend play. Indeed pretend play might be the most common form of spontaneous creative behavior in early childhood. Although both pretend play and creativity involve transforming reality in ways that are often novel and entertaining (Dansky & Silverman, 1973; Fein, 1987, Gelman & Gottfried, 2006; Runco & Pina, 2013; Russ, 2014), empirical evidence has not established a strong link between them. The results of the studies that have examined the relation between creativity and pretend play (e.g., Dansky, 1980; Pepler & Ross, 1981; Russ, Robins, & Christiano, 1999), have been inconsistent and not well replicated (Smith & Whitney, 1987). In a recent review of the literature,

Lillard et al. (2013) concluded that there is no convincing evidence that pretend play is related to creativity in children.

One of the goals of this dissertation was to examine this claim. In Lillard et al.'s review, most of the studies used measures of creativity that had the problems discussed earlier in this chapter. In addition, the assessments of pretend play often did not include elaborated role play – the creation of specific characters, either as imaginary companions (including invisible friends and personified objects) or as pretend identities that children act out (Harris, 2000; Taylor, Sachet, Mannering & Maring, 2013). Elaborated role play is a particularly striking form of pretend play. The descriptions of role play characters are often vivid and detailed (Gleason, 2004; Gleason, Sebanc & Hartup, 2000; Taylor, 1999) and can be stable across a period of months (Taylor, Cartwright, & Carlson, 1993) or even years (Taylor et al., 2004), as demonstrated in both children's verbal accounts and their drawings.

Given the high level of generativity involved in elaborated role play, children who engage in this specific type of pretending might be particularly likely to score higher than other children on creativity tasks, either because the practice of inventing imaginary characters might have a training effect or, alternately, because creative children might be the ones who find this type of pretend play particularly enjoyable. There is some evidence that is consistent with this hypothesis. Hoff (2005) found that having an imaginary companion was correlated with two measures of creativity (a divergent thinking task and a questionnaire about creative activities) in 10-year-olds. Similarly, Schaefer (1969) found that retrospective reports of imaginary companions were more common among adolescents who had been identified by teachers as creative. Mullineaux

and Dilalla (2009) found the frequency of preschoolers' role play during a free play session was related to later scores on a divergent thinking task during adolescence. In addition, retrospective reports of childhood role play are common among adults who pursue careers as actors (Goldstein & Winner, 2009) or fiction writers (Taylor, Hodges, & Kohanyi, 2002).

Despite these findings with older children and adults, research assessing creativity in young children has produced inconsistent findings (Manosevitz, Fling, & Prentice, 1977; Pearson et al., 2001). However, most of these studies used divergent thinking tasks to assess creativity. Thus, poor measurement could explain the null results. In this dissertation, I developed new measures of creativity for preschool-age children that could be assessed for creativity following Amabile's (1982) consensual assessment technique and examined the relation between children's performance on these measures and elaborated role play.

Summary

Evidence of creativity is present from a remarkably early age and is a vital part of the human experience, permeating virtually all domains of life. Understanding how creativity develops and manifests in children is an important piece of the creativity puzzle. However, there are many challenges in the study of creativity, including the wide range of scope, theoretical disagreements, and methodological issues. When children are the focus of interest, there are additional complications, particularly regarding measurement.

In this dissertation, I begin with a study investigating creative behavior in 4- and 5-year-old children with the development of two new measures of creativity (a narrative

task and a drawing task) that were coded using the consensual assessment technique. This study also examined the extent that these measures were related to elaborated role play (e.g., the creation of imaginary companions). I then describe a follow-up assessment of these children eight years later when they were 11 to 14 years of age, during which they completed a larger battery of creativity tasks with product creation tasks and divergent thinking tasks that varied in their inclusion of social content. In addition, children were interviewed about creative activities outside the lab, including imaginary companions and imaginary worlds (i.e., paracosms, in which children generate an imaginary place that they think about regularly) and also completed measures of coping skills, psychosocial adjustment, and aspects of executive functioning.

The goals in this dissertation were to: 1) develop measures of creativity that would be appropriate for preschool-age children; 2) assess the degree to which social forms of creativity are a distinct domain of creativity; 3) examine the relation between the measures of creativity and children's elaborated role play, independent of age and verbal ability; 4) examine the developmental continuity of creativity from Time 1 to Time 2, as well as collecting qualitative information about a creative activity of later childhood (i.e., the creation of imaginary worlds); and 5) explore how creativity might be related to individual differences in coping, psychosocial adjustment, and executive functioning. Shedding light on these issues will increase our understanding of children's creativity – including how to best measure early creativity, how aspects of children's creativity corresponds across different activities (in and out of the lab), and the degree to which these behaviors are consistent and predictive of later creativity.

CHAPTER II

ELABORATED ROLE PLAY AND CREATIVITY IN PRESCHOOL AGE CHILDREN

From Mottweiler, C. M., & Taylor, M. (2014). Elaborated role play and creativity in preschool age children. *Psychology of Aesthetics, Creativity, and the Arts*, 8, 277-286.

The purpose of this study was to develop creativity measures appropriate for preschool age children that could be administered in the laboratory, as well as to investigate the relation between individual differences on these measures and children's elaborated role play. Measures were developed that involved asking children to create stories and drawings – two different types of products that involve familiar activities for preschool children. The assessment of creativity was adapted from Amabile's (1982) consensual assessment technique, in which participants are asked to generate a product that is rated for overall creativity by appropriate judges.

Both storytelling and drawing have been used for assessing children's creativity in past research, but with mixed success. For research using storytelling, there is a tradeoff between procedures in which children are simply asked to tell a story and more constrained storytelling tasks. Spontaneously-generated stories with minimal or no prompts can provide rich qualitative information about the creative content of children's narratives (Ahn & Filipenko, 2007), but the wide variability in the content and length is problematic for a systematic investigation of individual differences in creativity. The use of consistent stimuli and prompts can provide more structure and thus make it easier to compare and rate children's narrative responses. For example, Hennessey and Amabile (1988) showed 5- to 10-year-old children a picture book with a readily understood plot

and asked them to say something about each page in the book. However, the picture book provided all of the story's content, leaving little scope for creativity. In that study, creativity scores were strongly correlated with the length of the children's stories, suggesting that the procedure might not have clearly distinguished creative innovation from talkativeness.

In an effort to address these challenges, Alexander et al. (1994) told 4- to 7-year-old children two stories involving a protagonist in trouble and asked them to finish the story by thinking of multiple ways to help him. This task provided some structure, while allowing for a wide range of responses. However, as in other divergent thinking tasks, children were required to generate multiple variations for a single story. The preschoolers had difficulty doing the task and it was also a challenge for most of the children to develop solutions that were original or effective. At Time 1 of this study, the participants, like those of Alexander et al. (1994), were told the beginning of a story and then asked to finish it. However, the new task did not involve generating alternatives; children provided a single completion that was then coded for creativity using Amabile's consensual assessment technique. This particular narrative task was based on the MacArthur Story Stem Battery in which an experimenter tells the beginning of a story with the use of dolls and props and then asks children to finish the story ("Show me and tell me what happens now") (Emde, Wolf, & Oppenheim, 2003).

Time 1 also included a measure of drawing creativity that was less verbally demanding than the storytelling task. This drawing task was adapted from Karmiloff-Smith's (1990) procedure for assessing the development of drawing in which children are asked to draw real and pretend versions of the same object (e.g., a real person and a

pretend person). Matuga (2004) used the Karmiloff-Smith task to assess children's creativity by having judges rate the "real" drawings for drawing ability and the "pretend" drawings for creativity. However, information about creativity is lost with this procedure because no attention is paid to the approaches children take to solve the problem of depicting real and pretend people. For example, some children draw a "pretend" person that is virtually identical to the "real" person, while other children deviate from the "real" person dramatically in their depiction of the "pretend" person. The level of deviation from the baseline "real" object is useful information when considering creativity. At Time 1 of this study, children were asked to draw a picture of a person and a picture of a pretend person. The children's solutions to the task of depicting real and pretend people were assessed for creativity using the consensual assessment technique.

Children's engagement in elaborated role play (i.e., creating invisible friends, personified objects, and/or pretend identities) was assessed using a procedure that involves interviewing both children and their parents (Taylor, et al., 2004). In addition, the range of creativity in children's descriptions of these characters was assessed. Past work has demonstrated that role play characters vary in their originality; some are based on real people (e.g., a pretend version of the child's best friend) or media characters (e.g., the Little Mermaid), while others are idiosyncratic and unique to the child (e.g., a tiny tie-dyed veterinarian named Elfie Welfie) (Hoff, 2005; Taylor, 1999). In this study, the elaborated role play characters were coded for creativity in order to assess the extent that individual differences in children's descriptions were related to creativity ratings on the other tasks.

This study also examined the possibility that measures of creativity are related to the general ability to engage in pretend play, rather than more specifically to elaborated role play. For this purpose, the action pantomime task was included, a measure of children's developmental ability to represent pretend objects (Overton & Jackson, 1973). In this task, children are asked to engage in pretend actions with an imagined object (e.g., "pretend to brush your teeth with a toothbrush"). During the preschool years, children tend to use body parts (e.g., when pretending to brush their teeth, they use a finger as the imaginary toothbrush), but by eight years of age, most children are able to integrate imagined objects with the pretend actions (e.g., they pretend to hold an invisible toothbrush). Unlike elaborated role play, this type of pretending task does not involve the creation of a character or other social/emotional content. Instead the focus is on the child's ability to represent a physical object that is used as a tool in a pretend action.

It was predicted that engaging in elaborated role play would be related to the laboratory measures of creativity, while performance on the action pantomime task would be related to verbal ability and age. In addition to investigating children's pretend play and creativity, a structured narrative task was included to assess and control for the possibility that superior language ability and/or the ability to structure narratives was related to creativity ratings (Reilly, Bates, & Marchman, 1998).

Method

Participants

Eighty-one children and their parents were recruited from the Psychology Department's Developmental Database (a database primarily based on birth announcements published in the local newspaper). Six children were excluded from

analyses; five because they were unable to complete the procedure and one because of outlier scores possibly related to his diagnosis of Asperger's syndrome. The final sample of 75 children (38 boys, 37 girls) ranged in age from 4 years, 0 months to 5 years, 11 months (mean age = 5 years, 0 months; $SD = 7$ months) and were all native English speakers with no known developmental disorders. The participants were primarily from European American, middle-class backgrounds, reflective of the local demographics where the study was conducted. Parents provided written consent for their children's participation and the children provided verbal assent.

Procedure

Children and their parents came to the laboratory to participate in an hour-long session. Before beginning the tasks, two experimenters developed rapport with the children by interacting and playing with them. Then an experimenter escorted children to a separate room where they completed tasks to assess pretend play, creativity, language ability, and the ability to structure a narrative. The tasks were presented in a fixed order for all of the children. According to Carlson and Moses (2001), fixed orders are standard practice for individual differences research because "it is critical that the individuals be exposed to identical stimulus contexts" (p. 1035), including the stimuli and the order in which the stimuli are presented. (See Carlson and Moses for an explanation of the interpretive problems that arise if counterbalanced orders are used for individual differences research).

Elaborated Role Play

Child role play interview. Using the procedure developed by Taylor et al. (2004), the experimenter asked children about imaginary companions in the following

way: “I’m going to ask you some questions about pretending. Some friends are real, like the kids who live on your street, the ones you play with. And some friends are pretend friends. Pretend friends are ones that are make-believe, that you pretend are real. Do you have a pretend friend?”

If children said “no,” they were asked if they had ever had a pretend friend. If children reported having a pretend friend, either current or past, they were asked a series of questions about it (e.g., name, age, gender, appearance, whether it was an invisible friend or a personified object, the activities that the child engaged in with the pretend friend, and what the child liked and disliked about the pretend friend).

Next, children were asked about pretend identities: “Now I’m going to ask you about another type of pretending. Sometimes children like to pretend they are someone else. They like to talk and act like another person or an animal. Do you pretend to be someone else – like another person or an animal?” Children who reported having a pretend identity were asked additional questions similar to those asked about imaginary companions. The interviews with the children were video recorded and then transcribed for coding.

Parent role play questionnaire. While the children were being interviewed, in a separate room parents completed a questionnaire about their children’s involvement in pretend play. The questions were similar to the questions in the child role play interview, focusing on imaginary companions and pretend identities.

Follow-up interviews. A second experimenter supervised the child while the experimenter who had interviewed the child initially reviewed the parent questionnaire to identify any discrepancies with what the child had reported and asked the parent follow-

up questions as necessary. For example, if a child said that he or she had a pretend friend but the parent reported that the child did not, the experimenter asked the parent about the imaginary companion described by the child (e.g., if the child had a real friend by that name). Then, the experimenter returned to where the child was playing and asked the child additional follow-up questions as necessary. For example, if a child said that he or she did not have a pretend friend but the parent reported that the child did, the experimenter asked the child about the imaginary companion named by the parent.

Coding of elaborated role play. After the data were collected from all of the families, the child participants were categorized as having invisible friends, personified objects, pretend identities or engaging in no form of elaborated role play, based on the transcriptions of the child role play interviews, the parent role play questionnaires, and the follow-up interviews.

Children were categorized as having an invisible friend if (1) they said that they had an invisible friend and provided a good description of it, or (2) they said that they had an invisible friend and their parents confirmed the invisible friend and provided a good description. The criteria for coding children as having a personified object were similar, with one additional condition to differentiate personified objects from transitional objects (e.g., a blanket or teddy bear that a child holds or carries for comfort, see Winnicott, 2005). To be categorized as having a personified object, the description had to go beyond the physical appearance of the object to include psychological details (e.g., “she is nice and listens to me”). The criteria for coding children as having a pretend identity also included an additional condition; descriptions of pretend identities had to go beyond

a description of a costume that a child might wear to include psychological details of the pretend identity.

All of the coding was completed by two graduate students and one professor. Reliability was acceptable for all coding (role play category, role play creativity, narrative creativity, and drawing creativity). The overlap in agreement for the three coders was 91% for invisible friends, 84% for personified objects, and 73% for pretend identities. Disagreements were resolved by assigning the scores of the majority (two out of three coders). Eight children met the criteria for more than one type of elaborated role play. For five of these children, the predominant type was identified by discussion. For three of the children, it was not clear which type of role play was predominant (e.g., child frequently pretended to be “Jena” while playing with an invisible “Balto”). These children were included as “role players” in analyses comparing role play to non-role play. However, they were excluded from analyses comparing different types of elaborated role play because their idiosyncratic experiences could not readily be categorized.

In addition to categorizing invisible friends, personified objects, and pretend identities, the creativity of the role play characters was assessed by the same three coders. The coders were instructed to independently read through all of the character descriptions to see the full range of responses (presented in different random orders), and then read them a second time to rate the characters for creativity on a scale from 1 (not creative) to 5 (highly creative) (Amabile, 1982). Coders were instructed to use the full range of the scale and to avoid using the amount of content included as an indicator of creativity, but were otherwise allowed to use their own definitions of creativity. This procedure yielded

good reliability among the three coders (Cronbach's alpha = .88). The mean average of the three scores was then calculated and used as an indicator of role play creativity.

Pretend Play Development

The action pantomime task was used as a behavioral measure of children's developmental level of pretend play (Overton & Jackson, 1973). In this task, children are asked to engage in pretend actions with an imagined object. Previous research has shown that holding a pretend object is easier for young children than performing other actions with the pretend object (Dick, Overton, & Kovacs, 2005). Therefore, in order to elicit a range of scores, two trials were included that only required pretending to *hold* the imaginary object, as well as seven trials that involved more complex *actions*. Children were asked to perform the nine pretend actions in the following order: (1) brush teeth with a toothbrush, (2) hold a pencil, (3) put on a pair of sunglasses, (4) hammer this (a wooden block) with a hammer, (5) hold a knife, (6) cut this (a piece of paper) with scissors, (7) pour water from a pitcher, (8) fan yourself with a fan, (9) flip a pancake with a spatula. Children's responses were coded for the use of a body part to represent the object required for the action (e.g., a finger to represent a toothbrush) or an invisible object (e.g., the child pretends to hold an invisible toothbrush). Children received a score for the number of times they used an invisible object (0-9). One child declined to participate in this task.

Narrative Creativity Task

To assess narrative creativity, children were presented with the beginning of a story and then asked to complete it (adapted from the MacArthur Story Stem Battery, Emde et al., 2003). To acquaint children with the demands of the task, they were first

asked to provide a completion for a warm-up story stem (“The Birthday Party”) that could easily be completed using a script familiar to most children. Two small female dolls (Susan and Jane) were used to act out the story stem for female participants and two small male dolls (George and Bob) were used for male participants. Then children were asked to complete “The Magic Key” story stem that was designed to elicit responses that could potentially vary in creativity. The experimenter placed a felt path and a small key on the table and walked the dolls down the path. “Susan/George and Jane/Bob are going for a walk outside when they see a key. Susan/George says, ‘What’s this on the ground?’ Jane/Bob says, ‘It’s a key. I wonder if it’s magic.’” Then the experimenter asked, “Can you show me and tell me what happens now?”

The three coders independently rated the creativity of children’s completions for “The Magic Key.” The coders were instructed to read through all of the transcribed story completions to see the full range of responses (presented in different random orders) and read the transcriptions a second time to rate each for creativity on a scale from 1 (not creative) to 5 (highly creative) (Amabile, 1982). Coders were instructed to use the full range of the scale (1-5) and to avoid using the children’s verbal ability or talkativeness as an indicator of creativity, but were otherwise allowed to use their own definitions of creativity. This procedure yielded high reliability among the three coders (Cronbach’s alpha of .95). The mean average of the three scores was calculated and used as an indicator of creativity on the narrative task. See Table 1 for examples of children’s completions.

Table 1. *Examples of Children's Story Stem Completions*

“Then they tried to open a door with the key and it opened and it had fake scary stuff, like fake scary xxxxx and costumes or Frankenstein costumes or mummies or pumpkin ones. Then they went out and locked the door. Then they went and then they went into jungle and with the key and they rode in the front until a board that came by and it took the key out of Bob's hand. And then it, then it put it down the chimney. And inside the chimney was on fire. It dropped the key and it fell in the fire.”

Overall creativity: 4.5

“She picks the key up and then they find something to unlock, like maybe, like that lock over there....It doesn't work. And then they pick up the key and then they found a lock and they put the key in it and they unlock it and the door opens. And then they say, 'Mom, Mom, a door opens!' And then they said, 'Come on' and then they went inside. And then they went and they set the key back where it was and she put it back there and they went home. Because they were supposed to be right here.”

Overall creativity: 2.5

Drawing Creativity Task

To assess creativity on a drawing task, children were first asked to draw a picture of a person and then to draw a picture of a “pretend person, a person that couldn't exist, a person that is made up” (adapted from Karmiloff-Smith, 1990). After children completed the drawings, they were asked to describe what they had drawn. Three children were excluded due to experimenter error and seven children did not want to participate in the task, possibly because it was one of the last tasks in the session. Of the 64 children who participated (87%), eight did not complete a drawing of a "pretend person."

For the 56 children who completed two drawings, the three coders independently rated them for creativity. The coders were instructed to look through the children's drawings and descriptions to see the full range of responses (presented in different random orders), and then go through them a second time rating the creativity of the children's solutions to the task of drawing a pretend person from 1 (not creative) to 5

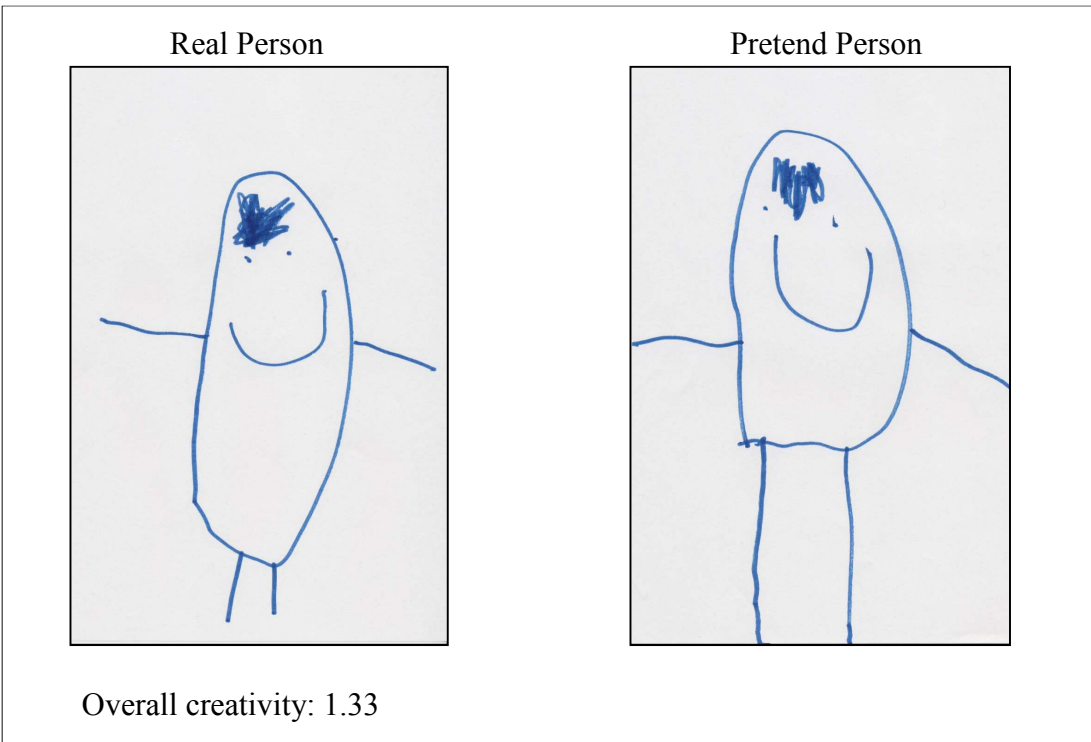
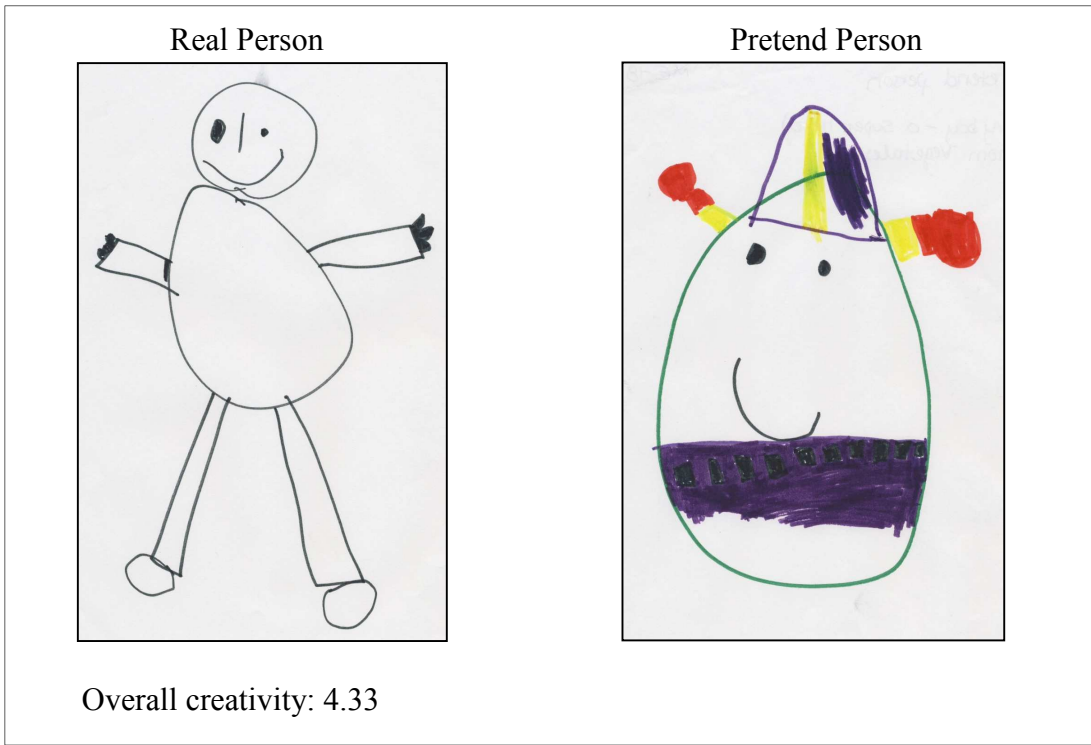
(highly creative) (Amabile, 1982). Coders were instructed to use the full range of the scale (1-5) and to avoid using drawing ability as an indicator of creativity, but were otherwise allowed to use their own definitions of creativity. This procedure yielded good reliability among the three coders (Cronbach's alpha of .88). The mean average of the three scores was calculated and used as an indicator of drawing creativity. See Figure 1 for examples of children's completions.

Language Ability

Frog, Where Are You? (Mayer, 1969) is a picture book that communicates a readily understood plot about a boy, a dog, and a lost frog without the use of any text. This book is often used to elicit narratives from young children for studying language development (Slobin, 2004). Children were asked to look at each page of the book and describe what was happening ("This book has a story about a boy, a dog, and a frog. We're going to look at all the pictures in the book and you're going to tell the story of what's happening"). If a child did not give a response for a page, the experimenter would prompt him or her by asking, "What do you think is happening on this page?" Two children did not complete this task. Children's narratives were later transcribed for coding.

To obtain an index of children's vocabulary, the number of non-repeating nouns, verbs, and adjectives included in the children's transcribed narratives were totaled, as described by Nicolopoulou (2009). To measure children's use of syntax, children's narratives were coded for the number of different types of complex sentences (coordinate sentences, adverbial clauses, verb complements, relative clauses, and passive sentences)

Figure 1. *Examples of Children's Drawings*



for a possible score of 0 to 5 (see Reilly et al., 1998). Half of the narratives were double-coded with 92% overlap reliability.

Narrative Structure

In past research, Trionfi and Reese (2009) found that children with imaginary companions (mostly invisible friends) did not differ from other children in vocabulary or story comprehension, but had more advanced narrative skills than other children. In order to control for children's ability to organize and structure a narrative in this study, a previously developed coding scheme was used to code children's narrations of *Frog, Where Are You?* (Reilly et al., 1998). Children received up to two points for the initiating event (i.e., the frog escapes and the boy looks for him in his bedroom), up to two points for search episodes (i.e., the boy looking for the frog in the woods), and up to two points for the resolution (i.e., the boy finds his frog and goes home) for a total possible score of 0 to 6. Half of the narratives were double-coded with 85% overlap reliability.

Data Analyses

Due to concerns about missing data (most notably for the drawing task) independent samples *t* tests and chi-square tests were conducted to compare children who completed all tasks with children who had missing data. As there were no significant differences for any of the variables as a function of missing data, all available data were included in the analyses: 75 observations for the narrative creativity task, whether or not the child engaged in elaborated role play, role play creativity, and demographic information; 74 for pretend play development; 73 for vocabulary, syntax, and narrative structure; 72 for type of elaborated role play; and 56 for drawing creativity task.

Results

In this study, two types of pretend play were measured: elaborated role play and general pretend play development (i.e., object substitution). The primary difference between the two is that elaborated role play involves representing social roles and characters, whereas object substitution involves representing physical transformations of objects without social content. While there are likely many ways that these two types of pretend play are similar, it was hypothesized that elaborated role play would be related to the measures of creativity, while object substitution would be related to age and language abilities.

Elaborated Role Play

The predominant form of elaborated role play was identifiable for 72 of the 75 children. Of the 72, 22 were identified as primarily having invisible friends (30.56%), 10 children were coded as primarily having personified objects (13.89%), 12 children were coded as primarily having pretend identities (16.67%), and 28 children were coded as not engaging in any form of elaborated role play (38.89%). There was a trend for role play category to be related to gender, $\chi^2(3, N = 72) = 6.60, p = .09, \phi = .30$, due to the greater number of girls who had personified objects and the greater number of boys who had pretend identities.

Consistent with previous research in this area, children described a range of different types of characters (see Table 2 for examples of invisible friends, personified objects, and pretend identities). The characters also varied in creativity ratings, $M = 2.66, SD = 1.15$, range = 1 to 5. Table 3 provides the means, standard deviations, the range of

scores as a function of type of role play (invisible friend, personified object, pretend identity, or no role play).

Table 2. *Examples of Children's Elaborated Role Play*

Invisible Friends:

Ava (4-year-old girl): An older girl who has black hair. She likes to play with the child's dolls, colors pictures for the child, and decorates the child's room. Sometimes Ava doesn't want to play with the child and prefers to play with her brother.

Big Kittens and a Little Kitten (4-year-old boy): Pink and brown kittens that can do "all the tricks" that the child likes, play with a ball of string, and chase a pretend mouse that flies a pretend airplane and "goes out the window."

Personified Objects:

Nuni (5-year-old girl): A large, stuffed, purple unicorn as big as the child that can "almost fly" and likes to play checkers. There's nothing about Nuni that the child doesn't like.

Froggy (4-year-old boy): A stuffed green and white frog that likes to play the guitar, watch television, and likes to be fed fly soup. The child doesn't like it when "he's a bad boy."

Pretend Identities:

Superman (4-year-old boy): A superhero who is 10 years old and likes to rescue the town. He has special powers that allow him to "save the world." The child doesn't like snoring when he pretends to be Superman.

Fairy (5-year-old girl): The child pretends to be a fairy with wings that can fly away from people and can fly to the moon. The child likes to pretend that she can touch the clouds and stand on the clouds.

Table 3. Means, Standard Deviations, and the Range of Scores as a Function of Elaborated Role Play

	Total (n=75)	No role play (n=28)	Invisible friend (n=22)	Personified object (n=10)	Pretend identity (n=12)
Gender n=75	38 Boys 37 Girls	14 Boys 14 Girls	11 Boys 11 Girls	2 Boys 8 Girls	9 Boys 3 Girls
Age (in months) n=75	59.84 (7.04) 49 to 71	59.00 (6.97) 49 to 71	61.14 (6.88) 50 to 71	59.30 (9.31) 49 to 71	59.75 (6.31) 50 to 68
Vocabulary n=73	44.79 (12.50) 12 to 84	42.22 (9.88) 26 to 71	46.23 (16.84) 12 to 84	44.44 (10.63) 18 to 56	46.92 (17.33) 22 to 83
Syntax n=73	2.22 (.93) 0 to 4	2.07 (.92) 1 to 4	2.32 (.95) 0 to 4	2.00 (1.00) 1 to 4	2.25 (.87) 1 to 4
Narrative structure n=73	3.77 (1.44) 0 to 6	3.70 (1.26) 0 to 6	3.82 (1.33) 1 to 6	3.78 (1.48) 1 to 5	3.75 (1.87) 0 to 6
Pretend play development n=74	5.61 (1.83) 0 to 9	4.78 (1.89) 0 to 8	6.32 (1.32) 4 to 9	6.10 (1.10) 4 to 8	5.42 (2.15) 3 to 9
Drawing creativity n=56	2.76 (1.20) 1 to 5	2.33 (1.22) 1 to 5	3.08 (1.22) 1 to 5	3.08 (1.00) 1.33 to 4.33	2.70 (1.06) 1.33 to 4.33
Narrative creativity n=72	2.22 (1.25) 1 to 5	1.76 (.83) 1 to 3.67	2.56 (1.47) 1 to 5	1.83 (.98) 1 to 4	2.82 (1.42) 1 to 5
Role play creativity n=45	2.70 (1.17) 1 to 5	...	3.29 (1.09) 1 to 5	2.03 (.81) 1 to 3.67	2.03 (.90) 1 to 3.67

One-way ANOVAs examining differences for age, vocabulary, syntax, and narrative structure (dependent measures) as a function of role play (between group factor) yielded no significant effects. In addition, the creativity of role play characters was not correlated with age, vocabulary, syntax, or narrative structure (see Table 4). In contrast to the findings for role play, performance on the measure of pretend play development (the action pantomime task) was significantly correlated with age, vocabulary, syntax, and marginally with narrative structure (see Table 4). There was no significant difference in action pantomime scores as a function of gender.

Controlling for age, vocabulary, syntax, and narrative structure, a one-way ANOVA found that children who engaged in elaborated role play scored significantly higher on the action pantomime task than non-role players, $F(1, 66) = 5.80, p = .019, \eta^2 = .08$. For the comparisons of each type of role play to non-role play (controlling for age, vocabulary, syntax, and narrative structure), a Bonferroni correction was used to set the significance level at .016. These analyses show a trend for children with invisible friends to score higher than children who engaged in no form of role play, $F(1, 42) = 6.11, p = .018, \eta^2 = .12$. The scores for children with personified objects and pretend identities did not differ significantly from the scores of children who engaged in no form of role play, ($p = .07, p = .63$, respectively).

Creativity

The creativity ratings for the narrative task were positively correlated with vocabulary, and syntax, suggesting that children with superior language skills produced stories that were rated as more highly creative. Creativity ratings on the narrative task were not related to age, sex, or narrative structure. The creativity ratings for the drawing task were

positively correlated with age, but were not related to any of the other variables (sex, vocabulary, syntax, or narrative structure). See Table 3 for means and standard deviations and Table 4 for correlations.

These results suggest that aspects of general development or ability might be associated with enhanced creativity or influence the way adults code children's responses for creativity. Therefore, partial correlations were conducted to evaluate the relations among the narrative, drawing, and role play creativity measures, controlling for age, vocabulary, and syntax. These analyses indicated that all three measures of creativity were correlated: narrative creativity ratings and drawing creativity ratings, $r(49) = .42, p = .002$, narrative creativity ratings and the creativity ratings of role play characters, $r(41) = .30, p = .04$, and there was a trend between drawing creativity ratings and role play creativity ratings, $r(32) = .30, p = .07$. These findings demonstrate associations between the measures of creativity that are not better accounted for by developmental level or verbal ability.

Are Children Who Engage in Elaborated Role Play More Creative Than Other Children?

In order to examine this question, two ANCOVAs were conducted with role play status (any form of elaborated role play vs. no role play) as the between group factor and creativity ratings (drawing and narrative) as dependent measures, controlling for age, vocabulary, and syntax. Separate ANCOVAs were conducted for drawing creativity ratings and narrative creativity ratings because of the difference in sample size for these comparisons (73 vs. 54 children). The analysis for the narrative creativity measure

Table 4. *Correlations among Measures of Developmental Abilities and Creativity Measures*

Measure	1	2	3	4	5	6	7	8
1. Age	–							
2. Vocabulary	.20	–						
3. Syntax	.03	.58**	–					
4. Narrative structure	.24*	.06	.26*	–				
5. Pretend play development	.26*	.29*	.32**	.23	–			
6. Drawing task creativity	.32*	.21	.18	-.17	.31*	–		
7. Narrative task creativity	.12	.29*	.27*	.08	.21	.46**	–	
8. Role play creativity	.12	.16	.18	.08	.38**	.36**	.40**	–

* $p < .05$

** $p < .001$

yielded a significant effect for role play status, $F(1, 68) = 6.31, p = .039, \eta^2 = .06$, with role-players scoring higher than non-role players. The analysis for the drawing creativity measure yielded a trend for the effect of role play status, $F(1, 49) = 3.08, p = .09, \eta^2 = .06$, with role-players scoring higher than non-role players.

Children in each of the role play groups (i.e., invisible friends, personified objects, and pretend identities) were also compared with children who did not engage in any form of elaborated role play. In order to evaluate these differences, a Bonferroni correction was used to set the significance level at .017. For narrative creativity, children with pretend identities were rated as more creative than non-role players, $t(38) = 3.01, p = .005$, and there was a trend for children with invisible friends to be rated as more creative than non-role players, $t(48) = 2.44, p = .019$. The comparison with non-role players was not significant for children with personified objects ($p = .83$). For the drawing creativity measure, there was a trend for children with invisible friends to be rated as more creative than non-role players, $t(33) = 1.81, p = .08$. The comparison with non-role players was not significant for children with personified objects ($p = .14$) or for children with pretend identities ($p = .42$). While the overall results demonstrate a connection between engaging in elaborated role play and creativity, it appears that it was primarily children with invisible friends and, for the narrative creativity task, children with pretend identities driving these findings. This finding is mostly consistent with the creativity ratings of role play characters; the invisible friends were judged to be more creative than the personified objects, $t(30) = -3.26, p = .003$, and the pretend identities, $t(32) = 3.42, p = .002$. However, there was no difference between the creativity of pretend identities and personified objects, $t(20) = .02, p = .99$.

Unlike the findings of relations between elaborated role play and laboratory measures of creativity, partial correlations (controlling for age and language ability) indicated that the developmental level of pretend play (action pantomime task) was not related to narrative creativity ratings, $r(67) = .10, p = .42$, drawing creativity ratings, $r(49) = .20, p = .16$, or role play creativity ratings, $r(41) = .19, p = .23$.

Discussion

This study sheds light on how individual differences in creativity during the preschool years might be related to pretend play activities. Elaborated role play was related to measures of narrative creativity and drawing creativity. In contrast, the developmental level of children's pretend play ability on the action pantomime task was not related to measures of narrative creativity, drawing creativity, or role play creativity. The results comparing the specific types of elaborated role play to non-role play suggest there could be relative benefits associated with different types of role play. Children with pretend identities and children with invisible friends told the most creative stories, suggesting that these children might be particularly inclined to act out various plots and include inventive narratives in their play. Children with invisible friends provided the most creative solutions to drawing a pretend person, perhaps because inventing an invisible friend has some similarity to the task of drawing a person who could not exist and both tasks involve visual imagery. In a study related to the latter point, Tahiroglu, Mannering and Taylor (2011) found that individual differences related to visual imagery with invisible friends was related to imagery use on laboratory tasks.

In addition to role play categories, the creativity of the children's role play characters was assessed and found to be correlated with creativity ratings on the two

other creativity tasks. Invisible friends were rated as more creative than personified objects or pretend identities, probably because descriptions of invisible friends often have idiosyncratic appearances, behaviors and personalities. In contrast, the descriptions of personified objects tend to be based on the characteristics of the toys. And while pretend identities can sometimes be quite inventive (e.g., an “old guy” who walks so slow he can travel through time), they often include media figures (e.g., Princess Jasmine; Spiderman) that are typically not considered particularly creative unless the child provides additional elaboration.

While these findings establish a relation between role play activities and creativity, conclusions about causality cannot be drawn. It could be that engaging in elaborated role play provides children practice and opportunities to engage in the type of invention or imagery that promotes enhanced creativity on other types of tasks. However, children who are more creative might also be predisposed to engage in open-ended generative activities like role play (as opposed to more concrete types of play, such as puzzles). It is also possible that a third variable, such as flexible thinking, leads children to be more creative *and* more likely to engage in elaborated role play.

These results contrast with those of previous studies that did not find a relation between early role play activities and creativity (Manosevitz et al., 1977; Pearson et al, 2001). However, past research has relied on divergent thinking tasks, which require children to generate multiple answers to the same question. For this study, instead of relying on the *quantity* of products generated, creativity measures were developed that intended to assess the *overall creativity* of products generated. In addition, most divergent thinking tasks focus on objects or abstract content rather than social entities.

The narrative task and the drawing task both included references to people (e.g., thinking about the behaviors of two children who found a key, thinking about how to portray a person who is pretend) and thus were possibly a closer match to the content of elaborated role play in which children invent imaginary characters.

It could be that elaborated role play and the two measures of creativity are specifically reflective of social forms of creativity and not necessarily related to creativity that does not include social content. This possibility is consistent with the finding that elaborated role play was related to the included creativity measures (that potentially prompted social creativity), whereas children's pretend play ability on the action pantomime task (a measure of pretend play that is non-social in content) was not related to the creativity measures.

One way to help elucidate these possibilities is to conduct a follow-up assessment of these children to examine how these early signs of creativity are related to a larger battery of creativity measures that includes both social and object-focused tasks. Specifically, would the measures developed during this study also work with older children? How might the measures with social content be similar to or different than measures focused on object-manipulation? How consistent is creativity – is creativity during the preschool years related to later indicators of creativity? Chapter 3 describes a follow-up study of these children eight years later when the children were 11 to 14 years old that aimed to answer these questions.

CHAPTER III
THE DEVELOPMENT OF SOCIAL CREATIVITY:
A FOLLOW-UP STUDY

Introduction

The results of the study at Time 1 showed that elaborated role play was related to two new measures of creativity with preschool age children, independent of age and language ability. Conducting a follow-up assessment of these children several years later allowed for the opportunity to assess the usefulness of these measures with an older age group as well as examine the developmental continuity of individual differences in creativity assessment on these measures. In addition, children at Time 2 completed two creativity measures that did not include social content for comparison with four creativity tasks that did involve social content (i.e., the drawing creativity task and narrative creativity task from Time 1 and two additional social creativity tasks). With this full battery of creativity tasks, it was possible to test the hypothesis that the shared social content of the creativity measures at Time 1 might have contributed to their inter-correlations, as well as their correlations with elaborated role play. In this follow-up study, I also explored hypotheses about the relations between creativity, executive function, coping, and psychosocial functioning.

Measurement of Creativity

The two measures of creativity used at Time 1 were adaptations of tasks that have been used for other purposes. The results suggested that these tasks might be useful for assessing creativity in young children. However, the claims made about these tasks at Time 1 are speculative. For example, to what extent are their inter-correlations due to the

shared feature that the tasks involved thinking about the social world (i.e., how to create a person who does not exist, how to end the story about two children in the woods)?

Recent research in our lab (Taylor et al., in prep) indicates that creativity measures with social content have a differential pattern of results from measures that do not include social content, but this finding warrants further investigation.

In order to investigate the social/nonsocial distinction, the follow-up study included a battery of creativity measures that varied in the extent that they included social content. Three of the measures involved product creations, two of which included social content and were very similar to the tasks included at Time 1. The children were asked to complete a narrative task and a drawing task similar to the ones used at Time 1. The third product creation task did not have any references to people or social interactions in the instructions; for this task children were asked to generate a collage using colorful shapes to “make an interesting, silly design” (Amabile, 1982). According to Amabile (1982), this task is accessible and enjoyable for children and the creativity ratings of children’s collages generally do not appear to be dependent on special skills or age.

In addition to the product creation tasks, children also completed three divergent thinking tasks in which they were asked to generate as many solutions as possible in response to three questions: “What are all the uses that you can think of for a brick?”; “How would the world be different if people had long furry tails?”; and, “What are the things a person could do to try to make friends?” The question about how to use a brick is the most commonly-used test of divergent thinking and is focused on the manipulation of an object (rather than aspects of the social world). The other two tasks were developed in our lab as divergent thinking tasks that involve social content. The tails task involves

the consequences of a counterfactual fantasy scenario involving people and the making friends task involves a commonly encountered real-world social situation.

While there are drawbacks to divergent thinking tasks (as discussed in Chapter 1), they are the most commonly used measures in studies of creativity. Including divergent thinking in this study allowed for comparison with previous research as well as comparison between divergent thinking tasks and product creation tasks. Also, while it has been argued that young children likely struggle with the cognitive demands of these tasks, the children at Time 2 were old enough to understand the task demands. However, given the problems with standard scoring procedures for divergent thinking tasks, I used an alternative scoring strategy developed by Silvia et al. (2008). Each idea that a child generated was rated for creativity following Amabile's (1982) consensual assessment technique, with the score for a child's highest rated idea used as the index of creativity for the respective task. Silvia et al. found that creativity ratings of responses for divergent thinking tasks correlated with uniqueness ratings but avoided some of the methodological problems inherent in uniqueness coding.

While this study is focused on the distinction between social and non-social forms of creativity, the tasks also varied in the extent that they required verbal responses (i.e., the narrative task and the three divergent thinking tasks) or the creation of visual-spatial products (i.e., the drawing task and the collage task) and the extent that they included fantasy content (e.g., drawing an imaginary person, imagining a world in which people have tails) or were more reality-based (e.g., thinking of uses for a brick, thinking of ways to make friends). This range of measures was included to make the tasks generally

accessible and engaging to a large number of children, as well as allow for exploration of potential differences as a function of these variables.

In addition to increasing our understanding of social vs. nonsocial creativity, this study is unique in its inclusion of preschoolers in a longitudinal design. Past longitudinal research has focused on older children (e.g., Charles & Runco, 2001; Smith & Carlsson, 1990) and while some studies have administered laboratory measures of creativity to preschoolers, to my knowledge there have not been any longitudinal follow-ups to this work. Collecting data at Time 2 will fill this gap by exploring how performance on measures of social creativity might change over time, the degree to which social creativity is a stable trait from preschool age to middle school age, and how indicators of social creativity at Time 1 are related to a range of measures of later creativity at Time 2.

Creativity in and out of the Laboratory

Along with laboratory measures of creativity, children at both Time 1 and Time 2 were interviewed about imaginative activities in their everyday lives. At Time 1 when the children were 4 to 5 years of age, they were interviewed about their elaborated role play (i.e., having an imaginary companion or pretend identity) and this activity was found to be related to performance on both of the laboratory creativity measures. Interviews about imaginary companions were also included at Time 2 because some children continue to interact with imaginary companions in later childhood and adolescence, although imaginary companions are less common at this age than in early childhood (Pearson et al., 2001; Taylor, Hulette, & Dishion, 2010). The questions about pretend identities were dropped at Time 2 because in a study of 8- to 12-year-old children, we found that pretend identities were rarely reported in this age group (Taylor et al., in prep).

In addition to questions about imaginary companions, children at Time 2 were asked about a type of imaginative activity that is believed to peak in middle childhood – the creation of an imaginary world or “paracosm.” A paracosm involves the invention of an imaginary place that is thought about regularly and often includes elaborated details, such as fictional governments, geographies, languages, religions, legal systems, histories, architecture, and special animals (Cohen & MacKeith, 1991). At Time 2, a paracosm was operationalized as a specific “other” place, either partly or wholly of the child’s invention that is thought about repeatedly over some period of time (evidence for this might be the naming of places and characters, the elaboration of a continuous narrative, or the creation of artifacts associated with the place), and that has importance for the child even though he or she knows the place is imaginary (Root-Bernstein, 2014; Silvey & MacKeith, 1988).

Accounts of paracosms have been found in the biographies of individuals who later became famous for their creative work (e.g., the Brontë children created paracosms that have been described as laying the groundwork for their adult work as novelists; Ratchford, 1949). In addition, individuals acknowledged for being highly creative as adults (i.e., recipients of MacArthur Awards) were found to be more likely to recall paracosms in their childhood than a comparison group (Root-Bernstein & Root-Bernstein, 2006). More recently, in our study of 8- to 12-year-old children, the children with paracosms scored higher on measures of social creativity, but not other measures of creativity (Taylor et al., in prep). Thus, at Time 2, I hypothesized that children who were identified as having paracosms would score higher on measures of social creativity than children without paracosms. The longitudinal design of this research also allowed me to

explore whether preschoolers who engage in elaborated role play might be the ones who are the most likely to go on to create paracosms later in childhood.

In addition, it was possible to examine the degree to which early role play behaviors were related to later performance on laboratory creativity measures. Some support suggesting that early elaborated role play is related to later creativity comes from retrospective research with creative adolescents and adults who often remember having imaginary companions as children (Goldstein & Winner, 2009; Schaefer, 1969; Taylor, Hodges, & Kohanyi, 2002). In addition, one study found that prompted role play behaviors during a laboratory task in early childhood were predictive of divergent thinking scores several years later (Mulineaux & Dilalla, 2009). Thus, I hypothesized that engaging in elaborated role play at Time 1 would be related to performance on creativity measures at Time 2. In addition, given the possibility that imaginary companions might be most reflective of social creativity, I hypothesized that early elaborated role play would be most strongly associated with the creativity measures that include social content.

Coping and Psychological Adjustment

In addition to examining the development of creativity, this project allowed for the exploration of other behaviors that might be related to creativity. I am particularly interested in how creativity might be related to coping skills and other aspects of psychosocial adjustment. Creativity in the real world is sometimes prompted in environments with challenging problems that are resource deficient and do not have obvious solutions (thus, requiring novel solutions). The ability to generate effective solutions is valuable and in some cases necessary for survival and successful adaptation

(Runco, 2007). In particular, social forms of creativity might be relevant for generating solutions to social interactions or relationships. Some evidence for this hypothesis comes from work suggesting that imaginary companions might be beneficial for coping with challenging circumstances. In a longitudinal study of at-risk adolescents, Taylor, Hulette, and Dishion (2010) found that having an imaginary companion at age 12 was predictive of more positive adjustment at the end of high school. In addition, there is growing evidence that play-based interventions that often include activities such as role play and creating superhero characters can be helpful for children coping with stressful experiences (Bratton, Ray, Rhine, & Jones, 2005). For example, Sadeh, Hen-Gal, and Tikotzky (2008) found that encouraging children who were experiencing high levels of environmental stress to engage in role play with a stuffed animal led to decreases in stress symptoms over a three month period.

The present study aimed to contribute to this body of research by examining the relation between social creativity and coping strategies, both concurrently as well as over time. I predicted that children who demonstrated higher levels of social creativity early in life would engage in more effective coping strategies and positive aspects of psychosocial adjustment in later childhood.

Executive Functioning

Executive functioning (or the deliberate control of cognitive processes, such as inhibitory control, cognitive flexibility, and working memory) has gained widespread interest among researchers as a set of key abilities for children's development and academic success (see Zelazo et al., 2013). Given the various benefits of executive functioning, it is not surprising that some studies have found executive functions to be

positively correlated with creativity (Benedek, Franz, Heene, & Neubauer, 2012; Nusbaum & Silvia, 2011; Lin, Tasi, Lin, & Chen, 2014). However, it has also been argued that some aspects of executive functioning might actually hinder creativity, particularly inhibitory control (i.e., the ability to suppress irrelevant information). Creativity often involves making connections between ideas that are remotely associated. The argument is that these types of ideas might be blocked or ignored if a person focuses attention too narrowly on a problem, inhibiting any information that is potentially distracting (including remote associates). Whereas when inhibition is lowered, there is possibly more opportunity to form remote associations, which are considered to be the building blocks of creative ideas (Mednick, 1962).

There is some empirical work that provides support for this hypothesis. For example, Carson, Peterson, and Higgins (2003) found adults with more creative achievements demonstrated decreased inhibitory control (i.e., were more likely to attend to distractors) on a laboratory task. In addition, some studies have found clinical populations noted for having lowered inhibition to perform better on creativity tasks (compared to healthy controls), including individuals with attention deficit hyperactive disorder (White & Shah, 2006), symptoms of schizotypy (Mohr, Graves, Gianotti, Pizzagalli, & Brugger, 2001), and bipolar disorder (Andreason, 1987). To explore the relation between aspects of executive function and creativity in this study, children at Time 2 completed a series of executive functioning tasks (measures of inhibitory control, task switching, and working memory).

Method

Participants

Of the 75 children who participated at Time 1, 42 participated at Time 2 approximately 8 years later. Recruitment efforts were made via phone, mail, email, and/or Facebook. Families who expressed interest in participating were scheduled for a one-time session. I was unable to contact 21 families and 12 families indicated that they were not interested or available to participate. Thus, out of the possible 75 children who were eligible for inclusion, data were collected from 42 children (56%). This retention rate is similar to other longitudinal studies in the creativity literature (Mullineaux & Dilalla, 2009, 64%; Claxton, Pannells, & Rhoads, 2005, 58%; Wallace & Russ, 2015, 67%). There were no significant differences between the 42 families who participated at Time 2 and the 33 families who were assessed at Time 1 but did not participate at Time 2 on measures of parental education, ethnic background, child age, verbal ability, pretend play development, elaborated role play, or creativity. One child who participated at Time 2 was found to have outlier scores on several measures and was not included in further analyses.

The final sample of 41 children (21 boys, 20 girls) ranged in age at follow-up from 11 to 14 (mean age = 12 years, 9 months, $SD = 10$ months). All of the children were native English speakers with no known developmental disorders. The ethnicity of the children was identified by their parents as: Caucasian (78%), Hispanic, Latino, or Spanish (5%), Asian (5%), Alaskan Native or American Indian (2%), Other or multiple ethnicities (5%), or the data were missing (5%). Parent education ranged from "High

school" to "Graduate degree," with 56% of the sample reporting a Bachelor's degree or higher.

A power analysis conducted with GPower indicated that 41 participants provided enough power to detect medium-sized effects ($f^2 = .20$). This power is lower than what would be preferred for testing all hypotheses, but the number of participants from the original sample restricted the possible sample size.

Time 2 Procedure and Measures

Of the final sample of 41, 37 families attended a two-hour session at the University of Oregon. Given that some families had moved out of the area, one family was interviewed at their home (within driving distance) and three were interviewed via video teleconferencing (e.g., Skype). Because it was not feasible for participants to complete the flanker task via video teleconferencing, this task was omitted from the procedure for these three participants. Other than this omission, the procedure and tasks were presented in the same fixed order and similar manner for all of the participants. One experimenter (CM) administered all of the assessments.

Consent and assent were reviewed with the parents and children. Then the experimenter escorted children to a separate room where they completed a series of creativity tasks that varied in the extent that they involved social content, fantasy, and the degree to which they required verbal or visual-spatial responses. Children were interviewed about paracosms and imaginary companions (including follow-up questions regarding imaginary companions reported at Time 1) and completed measures of executive functioning (including inhibitory control, task-switching, and working memory), verbal comprehension, coping skills, and counterfactual thinking. The tasks

were completed in the following fixed order: collage task, tails consequences divergent thinking task, narrative task, counterfactual thinking task, unusual uses task, drawing task, making friends divergent thinking task, imaginary companion interview, paracosm interview, a short break, flanker task, digit span, Children's Coping Strategies Checklist, Peabody Picture Vocabulary Test-Fourth Edition, and trail making. While children were being interviewed, parents completed questionnaires regarding their children's psychosocial adjustment, imaginative activities, media use, and special interests. At the end of the session, the children were each given \$30. While pilot data were collected on children's media use, special interests, counterfactual thinking, and discernment of creative ideas, these data were not central to the study's hypotheses and will not be discussed further.

Creativity measures.

Narrative creativity task (adapted from the MacArthur Story Stem Battery, Emde et al., 2003). Like the story stem task at Time 1, children were presented with the beginning of a story using dolls and props and asked to complete the story. Two small female dolls (Susan and Jane) were used to act out the story stem for female participants and two small male dolls (George and Bob) were used for male participants. The experimenter placed a doll-size door and a small key on the table and walked the dolls across the table to the key near the door. "Susan/George and Jane/Bob are going for a walk in the woods when they see something on the ground. Susan/George says, 'What's this?' Jane/Bob says, 'It's a key and look! There's a door over there.' Susan/George says, 'Let's see if it fits in the door.'" Then the experimenter said to the child, "Now it's your

turn - what happens next?" The data for this task are missing for three participants due to video equipment failure.

This task was very similar to the narrative task at Time 1, but it was altered to be more neutral with respect to fantasy content. The narrative task at Time 1 ended with one character asking if the key found on the path was magic, thus prompting a fantastical response. The story stem used at Time 2 did not refer to magic and thus it was possible to complete a creative story without including fantasy, making the task accessible for children who might be less inclined to tell fantastical stories.

The children's responses were transcribed from video-recordings and coded for creativity following Amabile's (1982) Consensual Assessment Technique. Three undergraduate research assistants read through all of the transcribed story completions to become familiar with the full range of responses (each coder read the completions in a different random order) and then read the transcriptions a second time to rate each narrative for creativity on a scale from 1 (not creative) to 5 (highly creative). Coders were instructed to use the full range of the scale (1-5) and to avoid using the children's verbal ability or talkativeness as indicators of creativity, but were otherwise allowed to use their own definitions of creativity. Reliability was high across the three coders (Cronbach's alpha of .91). The mean average of the three scores was calculated and used as an indicator of narrative creativity. See Table 5 for examples of children's story stem completions.

Table 5. *Examples of Children's Story Stem Completions at Time 2*

“Susan picks up the key and it fits the door and it opens. Jane says, ‘Let’s walk through the door and see what’s behind it.’ So they walk through the door. Once they walk through the door they find it’s just a door. The end.”

Creativity rating: 1.00

“So they pick up the key and they take it to the door and try to unlock the door but it’s not working. So...but when they put the key in, a map falls out of the lock. And they take the map and look at it and it shows where they are and where the real key is. So they start this big journey trying to find the key. And they walk and walk. It takes a long time. And eventually they come to this cave where the key is supposed to be. And they walk inside and they hear this growling and a wolf comes up and tries to fight them off. But what they didn’t know was that the key they had turned into a sword, so they fight the wolf off. And they went and found the treasure chest and there wasn’t a key anywhere so they used the key they already had to open the treasure chest. And it opened and inside there wasn’t a key but there was a note that said “all you need is to believe.” So they went back to the door and they believed that the key would work and the door opened and they started a whole other journey.”

Creativity rating: 4.67

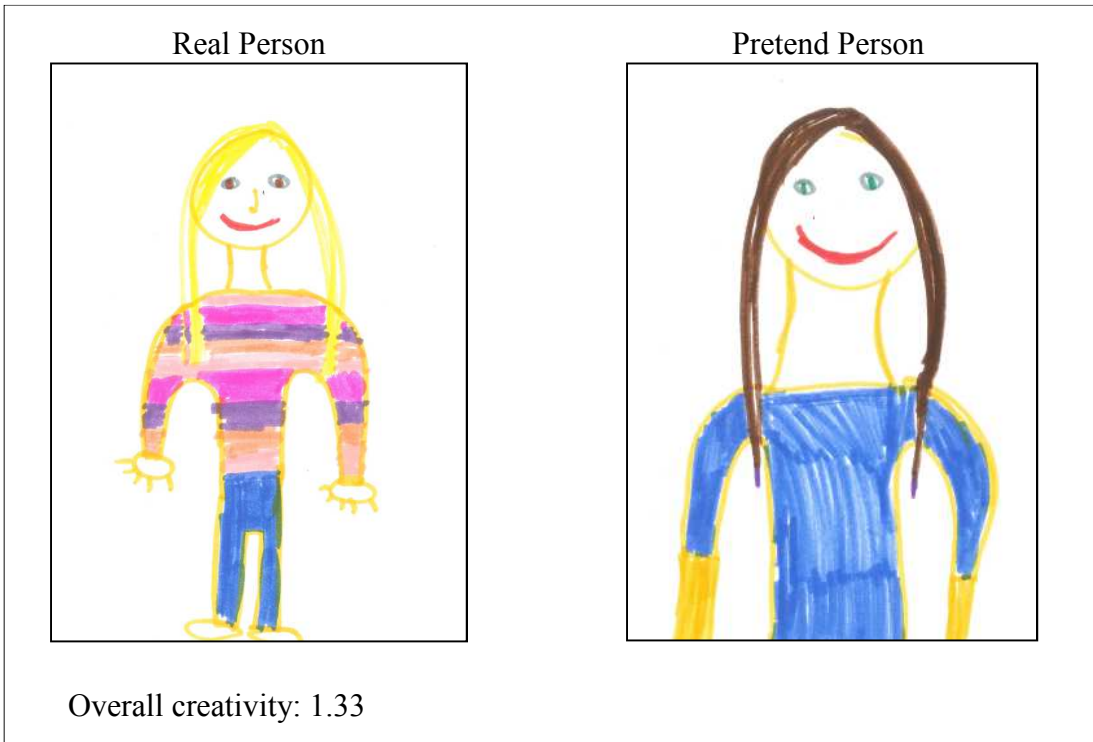
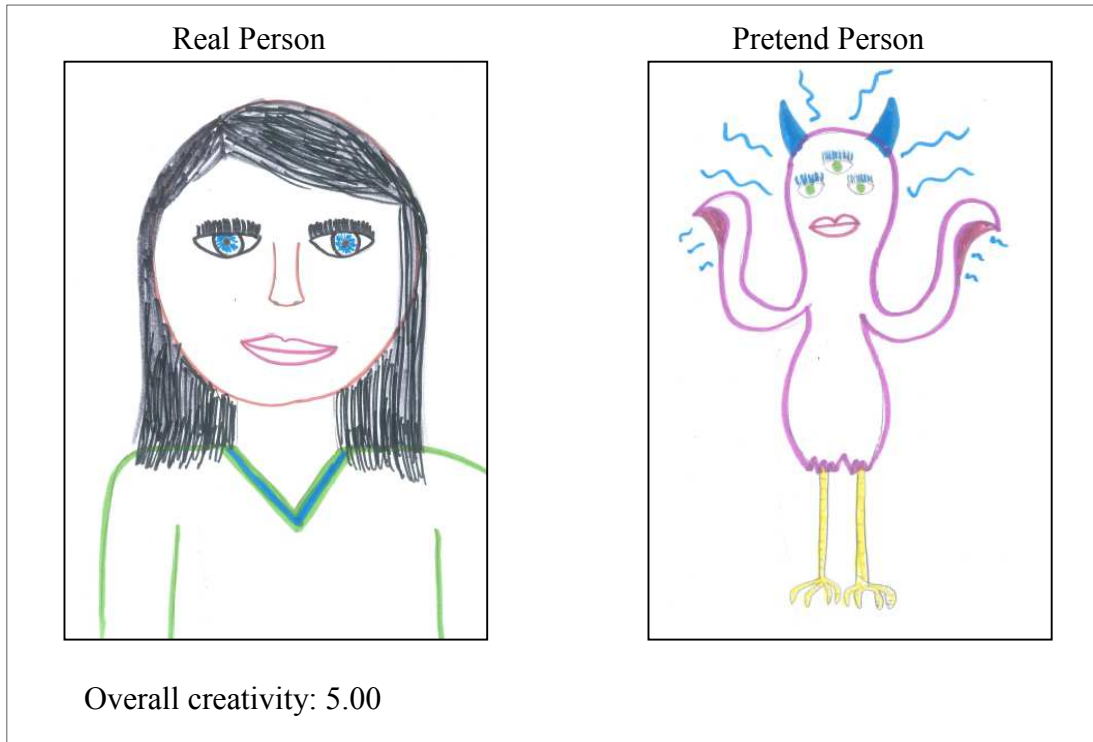
Drawing creativity task (adapted from Karmiloff-Smith, 1990). Like the drawing task presented at Time 1, children were provided with white paper and an assortment of colorful markers and asked to draw a real person and an imaginary person. The experimenter introduced the task by saying: "For this activity, first I want you to draw a real person. Afterwards, I want you to draw an imaginary or pretend person, someone that you make up." Given that older children are sometimes overly critical of their drawings (see Skypo, Ryan-Wenger, & Su, 2007) the following was added to the instructions: "The pictures don't have to be perfect, I'm more interested in the ideas that you come up with than in whether you can make a perfect drawing or not." The child was then asked to draw “a real person” followed by “an imaginary or pretend person, someone that you make up” and allowed approximately five minutes to complete each

drawing. After completing each drawing, the child was asked to describe the drawing: "Tell me about the real person" and "Tell me about the imaginary person." The data for this task are missing for one participant due to the family not returning the drawings in the mail (the child was interviewed via videoconferencing).

Creativity on the drawing task was coded following Amabile's Consensual Assessment Technique. Three undergraduate research assistants looked through all the drawings along with the transcribed descriptions to see the full range of responses (viewed in different random orders) and then rated the creativity of each child's solutions to the task of drawing a pretend person on a scale from 1 (not creative) to 5 (highly creative). Coders were instructed to use the full range of the scale (1-5) and to avoid using drawing ability as an indicator of creativity, but were otherwise instructed to use their own definitions of creativity. Reliability was good among the three coders (Cronbach's alpha of .88). The mean average of the three scores was calculated and used as an indicator of drawing creativity. See Figure 2 for examples of children's drawings and descriptions.

Collage creativity task (Amabile, 1982). This product creation task developed by Amabile (1982) was used as a measure of visual-spatial creativity without social content. The child was provided with a large, black piece of construction paper, a glue stick, and a 144-piece assortment of colorful, pre-cut paper shapes (squares, rectangles, triangles, circles, stars, and crescents in eight bright colors). The experimenter then said, "I want you to make an interesting, silly design by gluing these pieces of paper onto the black paper. You can use the paper in any way that you want to. You can use as many or as few of the pieces as you want, you don't have to use them all. You get to make the

Figure 2. *Examples of Children's Drawings at Time 2*

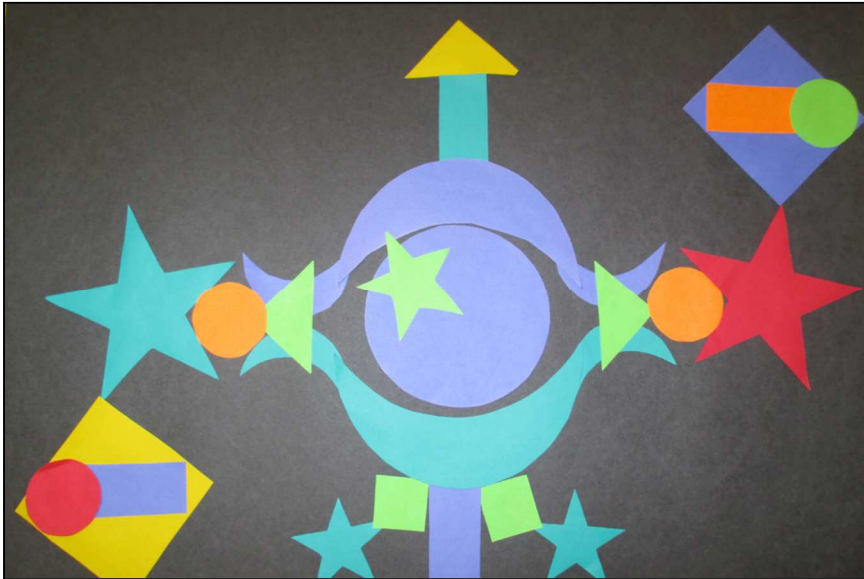


design however you want to.” The child was given ten minutes to complete the task. When the collage was finished, the experimenter asked the child to describe the design and took a photograph of the collage for later coding. The data for this task are missing for one participant due to camera equipment failure.

The collage task was coded following Amabile's Consensual Assessment Technique. Three undergraduate research assistants independently looked through the images of the collages on a computer screen along with the transcribed descriptions to see the full range of responses (presented in different random orders) and then rated the creativity of each child's collage on a scale from 1 (not creative) to 5 (highly creative). Coders were instructed to use the full range of the scale (1-5), but were otherwise allowed to use their own definitions of creativity. Reliability was fair among the three coders (Cronbach's alpha of .76). The mean average of the three scores was calculated and used as an indicator of collage creativity. See Figure 3 for examples of children's collages.

Unusual uses task (Guilford, 1967). This standard measure of divergent thinking involves asking participants to generate a list of possible uses for a common object. For this study, the experimenter placed a brick on the table and said: “This is a brick and you might be able to use this brick in different ways. What I want you to do now is to think of all the different ways you could use a brick (pause). What are the different uses that you can think of for a brick?” After the child provided a first response, the experimenter provided confirmation: "Yeah, that's one use for a brick. Can you think of other uses?" The experimenter continued prompting until the child had generated an exhaustive list of his or her ideas. If the child was unresponsive or said "I don't know," he or she was prompted to "think about it for a minute," and the question was repeated. The

Figure 3. *Examples of Children's Collages at Time 2*



Overall creativity: 4.33



Overall creativity: 1.00

experimenter recorded the child's ideas on a datasheet. To explore children's ability to distinguish creative ideas from less creative ones, the experimenter read aloud the final list of responses and asked the child, "Which one of these uses do you think is the most interesting or creative?"

The responses from all of the children were compiled into a master list, organized alphabetically to increase consistent coding across similar ideas (see Silvia, 2011), and then coded by three undergraduate research assistants for subjective creativity on a scale from 1 (not creative) to 5 (highly creative). Following Amabile's Consensual Assessment Technique, coders were instructed to read through all of the responses before rating creativity, use the full range of the scale and use their own definitions of creativity while coding, but to avoid using verbal ability as the basis for the ratings. Reliability was good among the three coders (Cronbach's alpha of .83). The mean average of the three scores was calculated for each idea and the highest rated response was used as the indicator of creativity on this task. Examples of ideas generated include: "You could use it to build something" (overall creativity: 1.33), "You can pretend that it is land from an alien planet" (overall creativity: 5.00).

In addition to subjectively rating the creativity of the ideas, the number of ideas each child generated that were not mentioned by any other child in sample (i.e., uniqueness) was identified as it is the most common procedure for coding divergent thinking tasks. Two coders read through the ideas and rated whether each idea was unique or not with 86% agreement. The mean number of unique ideas generated was 1.83, $SD = 1.90$, range = 0 to 7. Uniqueness was correlated with the subjective ratings ($r = .55, p < .001$). Given the strong correlation in combination with the recent criticisms

regarding uniqueness coding described in Chapter 1, only the score for each child's most highly rated response was used as the indicator of creativity for this task (and the other divergent thinking tasks).

Tails consequences divergent thinking task (Taylor et al., in prep). This task was designed to elicit divergent thinking about the consequences of an fantasy scenario that involved thinking about people and their social interactions. The experimenter presented the task to the child by saying: "I want you to think about all the ways the world would be different if people had long, furry tails (pause). How would the world be different if people had long, furry tails?" The experimenter provided prompting until the child generated an exhaustive list of his or her ideas. After the child had generated as many ideas as possible, the experimenter read aloud the list of responses and asked the child, "Which one of these ideas do you think is the most interesting or creative?" The data were missing for one child who was unable to generate any ideas for this task.

Children's responses were compiled into a master list that was coded by three undergraduate research assistants for subjective creativity on a scale of 1 (not creative) to 5 (highly creative) following Amabile's Consensual Assessment Technique. Reliability was good across the three coders (Cronbach's alpha of .83). The mean average of the three scores was calculated for each idea. The score for each child's most highly rated response was used as the indicator of creativity for this task. Examples of ideas generated include: "I guess it would be like kind of a way to mess with someone. You could pull their tail and that would hurt I assume" (Overall creativity: 1.67); "Maybe some of us would be treated better than others and there would be like 'tailism.' It'd be

like ‘Oh, I have a white tail and you have a brown tail,’ and then people would get in fights about it” (overall creativity: 5.00).

Making friends divergent thinking task (Taylor et al., in prep). This task is a divergent thinking task similar to the tails divergent thinking task in that it was expected to elicit ideas about the social world. However, unlike the tails task, it does not include content that is fantastical or counterfactual. Instead it involves a scenario that commonly occurs in the real world. The experimenter asked the child to: “Imagine that a kid your age just moved to a new school and wants to make friends. What are all the things he/she [matching the participating child's gender] could do to try to make friends?” The experimenter provided prompting until the child generated an exhaustive list of his or her ideas. After the child had generated as many ideas as possible, the experimenter read aloud the responses and asked the child, "Which one of these ideas do you think is the most interesting or creative?"

Children’s responses were compiled into a master list that was coded by three undergraduate research assistants for subjective creativity on a scale of 1 (not creative) to 5 (highly creative) following Amabile's Consensual Assessment Technique. Reliability was fair among the three coders (Cronbach’s alpha of .75). The mean average of the three scores was calculated for each idea and each child’s highest rated response was used as the indicator of creativity on this task. Examples of ideas generated include: “Talk to people” (Overall creativity: 1.33); “Bring cookies” (Overall creativity: 4.33).

Imaginary companion interview (Taylor et al., 2004). Children were interviewed about whether they currently had or in the past had created an imaginary companion. The experimenter introduced the topic of imaginary companions by saying,

“Now, I’m going to ask you some questions about activities that some kids like to do. First, I’m going to ask you about imaginary friends. An imaginary friend is someone who is make-believe; an imaginary person or animal that you play with, talk to, or think about a lot. Sometimes an imaginary friend is completely invisible and sometimes it is a toy, like a very special stuffed animal or doll. Do you have an imaginary friend?” If the child said “no,” the experimenter asked, “What about when you were younger – when you were a little kid, did you ever have an imaginary friend?” If the child indicated that he or she currently had an imaginary companion or ever had one in the past, the child was asked a series of questions about the companion (e.g., name, age, gender, appearance, personality, whether it was an invisible friend or a personified object, the activities that the child engaged in with the imaginary companion, and what the child liked and disliked about the imaginary companion). In addition, if the child had described an imaginary companion at Time 1, follow-up questions were asked about that imaginary companion (if not already addressed with the previous interview). The parent also answered similar questions about the child on the parent questionnaire.

Children were categorized as having an invisible friend if they said that they had an invisible friend and provided a good description of it or they said that they had an invisible friend and their parents confirmed the invisible friend and provided a good description. The criteria for coding children as having a personified object were similar, with one additional condition to differentiate personified objects from transitional objects (e.g., a blanket or teddy bear that a child holds or carries for comfort, see Winnicott, 2005). To be categorized as having a personified object, the description had to go beyond the physical appearance of the object to include psychological details (e.g., “she

is nice and listens to me”). The coding was completed by two coders. The overlap in agreement was 95% for invisible friends and 95% for personified objects. Disagreements were resolved by discussion.

In addition to identifying the children who had invisible friends or personified objects, the creativity of the children’s imaginary companions was assessed by the same coders on a scale from 1 (not creative) to 5 (highly creative). Reliability was good between the two coders (Cronbach’s alpha of .80). The mean average of the two scores was calculated and used as an indicator of imaginary companion creativity.

Finally, to examine how the experience of having an imaginary companion might change over time, children who were identified as having imaginary companions at Time 1 were asked at Time 2 if they remembered the past imaginary companion (if they had not spontaneously described the past imaginary companion during the previous question). See Table 6 for examples of children’s imaginary companions.

Paracosm interview (Taylor, Mottweiler, Naylor, & Levernier, 2015). The experimenter asked about paracosms by saying, “Some kids your age tell us they have a special imaginary place that they think about a lot. Is that something that you like to do?” If the child said “no,” the experimenter asked, “What about when you were younger, when you were a little kid, did you ever use to think about an imaginary place?” If the child indicated that he or she currently or in the past thought about an imaginary place, they were asked for a short description of it. If the child reported that he or she thought about a place that was partly or wholly of the child’s creation, the paracosm interview proceeded as follows: The child was shown a list that included topics that have been identified in past research as featured in some children’s paracosms (Root-Bernstein &

Table 6. *Examples of Children's Imaginary Companions at Time 2*

Invisible Friends:

Nature (11-year-old girl): A current, female alien who is 15 years old on Earth and 15,000 years old on her planet. She is strong, kind, and helps anyone who needs help.

Doot (11-year-old boy): A past, mysterious boy with pale-greenish skin who wore all black clothes and had dark hair. The child recalled blaming Doot for things like when he made a mess.

Personified Objects:

Little Bear (12-year-old boy): A current, small stuffed animal. The child described Little Bear as someone to talk when he is excited about something or is needing comfort when he is sad.

Gitter (12-year-old girl): A past, stuffed cat. The child described Glitter as a good friend whom she would play house and doctor with. The child recounted a time when she put a Band-Aid on Glitter after getting hurt herself, which made her feel better about the experience.

Root-Bernstein, 2006; Silvey & MacKeith, 1988; Taylor et al., 2015) and asked to circle the topics that were important for his or her imaginary place, with the semi-structured interview then tailored to focus on the topics selected. The parent questionnaire included similar questions about the child.

Two coders examined the child interviews and parent questionnaires to categorize children's responses. Of the 41 children in the study, 15 children said they did not think about imaginary places and 26 children said "yes." However only six of the 26 children who said yes went on to describe an activity that was coded by two researchers as the creation of a paracosm. The other children were coded as describing a "pre-paracosm," defined as a specific place either partly or wholly imaginary but with little evidence of repeated engagement with the place and/or not much elaborated detail (5

children); a fictional place created by others (e.g., Hogwarts, Narnia) (4 children); a play scenario involving a place that is common in children's pretend play (e.g., a doll house) (4 children); a real place the child had visited or would like to visit in the future (e.g., Disneyland, New York) (6 children); and other (e.g., a dream) (1 child). The overlap in agreement was 74% across the categories. Disagreements were resolved by discussion. See Table 7 for descriptions of children's paracosms.

Measures of coping and psychosocial adjustment.

Children's Coping Strategies Checklist (Ayers, 1996). This self-report inventory assesses the types of coping children engage in during times of stress. This scale was chosen because it does not focus on traumatic events, making it appropriate for use with normative populations. Following the standard procedure, the experimenter introduced the questionnaire by saying, "Sometimes kids have problems or feel upset about things. When this happens, they might do different things to solve the problem or to make themselves feel better. For each item that I say, choose the answer that best describes how often you usually do this behavior when you have a problem." The experimenter then presented a laminated sheet with the response scale printed on it and continued, "This could be never (1), sometimes (2), often (3), or most of the time (4). For each item, you can say the words or number that best describe how often you usually do the behavior. There are no right or wrong answers, just let me know how often you usually do each behavior to solve your problems or make yourself feel better." The experimenter then read aloud the 54 items for the measure and the child indicated the frequency that he or she engaged in each behavior. Following the scoring manual, four factors of coping were identified, which include Active Coping Strategies (e.g., "you tried to make things

Table 7. *Descriptions of Children's Paracosms at Time 2*

Somalockta (current paracosm, 11-year-old girl): A planet with two rings. There are two races that inhabit the planet in different areas: Somas and Locklas. Somas love nature and plants and are responsible for plants and animals. Locklas are responsible for maintaining the lava and rocks and they are not affected by heat or fire. The inhabitants look like humans, but do not breathe, so they can go underwater and fly into space. The two lands sometimes go to war. There are important characters, particularly Nature and her evil sister Firestorm, who the child creates stories about.

Spirit Realm (current paracosm, 12-year-old boy): An imaginary place with no physical constraints and a geographical layout that is always shifting, such as changing mountain ranges. The architecture of the buildings in the Spirit Realm was described as a cross between religious temples and old university-looking buildings. There are no cars, but people do travel on the train, which is the only place where the child imagines other people. The child imagines visiting the Spirit Realm to reflect when confused about something, and imagines it as a peaceful place, free of “the problems of the real world.”

Imaginary forest (current paracosm, 13-year-old girl): The child imagines that she is the ruler of a magical forest filled with friendly, cute animals and imagines that she has a home inside a tree there. The child is concerned about the welfare of the inhabitants, who all have special powers. There is no conflict or evil and everyone gets along. The child described the imaginary forest as making her feel happy, calm, and safe.

A small imaginary world (current paracosm, 12-year-old girl): An imaginary place where everything is tiny – tiny people, cars, TV, food, money, etc. The inhabitants ran shops, worked in gardens, and liked to ride skateboards. Everyone was equal in the world. However, there was a giant rabbit that the child described as similar to Godzilla, causing significant damage when walking through the small world.

Candyland (past paracosm, 12-year-old girl): An imaginary place based on the game Candyland and the film *Wreck-It Ralph*. Everything is made of candy: candy cars, candy buildings, candy racetracks, a chocolate milk river. There is art made of Skittles, M&Ms, and chocolate chips. Everything is edible and after being eaten will grow back. Christmas was celebrated with an ice-cream cone tree, Halloween pumpkins were made of candy, and the city was decorated with Peeps to celebrate other holidays. The child was the Queen. The only rule in Candyland is that you cannot murder; the punishment for murder is jail time and healthy food.

Wonderland (past paracosm, 12-year-old boy): An imaginary place adapted from *Alice in Wonderland*. The child generated new characters based on members of his family and homes for the inhabitants of Wonderland to live in. The child imagined having tea parties with the Mad Hatter and that there were lots of hats everywhere. He also enjoyed creating maps and designing details the world.

better by changing what you did”), Support Seeking Strategies (e.g., “you talked about your feelings to someone who really understood”), Distraction Strategies (e.g., “you went for a walk”), and Avoidant Strategies (e.g., “you tried to stay away from the problem”).

This questionnaire was missing for one child due to experimenter error.

Strengths and Difficulties Questionnaire (Goodman, 1997). Parents completed this 25-item questionnaire designed to screen for problematic symptoms and behaviors. Parents indicated on a 3-point scale how true each item is for their child (0 = not true, 1 = somewhat true, 2 = certainly true). The scale includes two subscales appropriate for a non-clinical sample: Externalizing (e.g., conduct problems: “steals from home, school, or elsewhere;” hyperactivity/inattention: “constantly fidgeting or squirming”) and Internalizing (e.g., emotional symptoms: “many fears, easily scared;” peer relationships: “picked on or bullied by other youth”). These were summed for a Total Difficulties score. An additional scale on this measure included Prosocial Behavior (e.g., “considerate of other people’s feelings”). Data for this measure are missing for two participants due to the parent not returning the parent questionnaire in the mail (the families lived out of town).

Autism Spectrum Quotient: Children's Version (Auyeung, Baron-Cohen, Wheelwright, & Allison, 2007). The parents completed the 50-item questionnaire designed to assess for behaviors consistent with symptoms of autism. This measure was included specifically to address questions suggesting paracosms are reflective of special interests characteristic of children with autism. In addition, as half of the items are reverse-scored on the Autism Quotient, it is possible to evaluate relative strengths as well as weaknesses along the five subscales: social skills (e.g., “S/he is good at taking care not

to hurt other people's feelings"), communication (e.g., "S/he is good at social chit-chat"), attention-switching (e.g., "If there is an interruption, s/he can switch back to what s/he was doing very quickly"), attention to detail (e.g., "S/he notices patterns in things all the time"), and imagination (e.g., "If s/he tries to imagine something, s/he finds it very easy to create a picture in her/his mind"). The parent was instructed to indicate on a 4-point scale from "definitely agree" to "definitely disagree" whether a statement described his or her child. In addition to the five subscales, a total score was also calculated. Data for this measure are missing for two participants due to the parents not returning the parent questionnaire in the mail and one participant due to parent not answering approximately half of the questions.

The Grit Scale (Duckworth, Peterson, Matthews, & Kelly, 2007). The parents completed this 12-item questionnaire designed to assess children's "perseverance and passion for long-term goals." The items are rated on a 5-point Likert scale (1 = not at all like my child, 5 = very much like my child). In addition to the total, there are two subscales: consistency of interests (e.g., "he/she has achieved a goal that took years of work") and perseverance of effort (e.g., "he/she has overcome setbacks to conquer an important challenge"). Data for this measure are missing for two participants due to the parent not returning the parent questionnaire in the mail.

Measures of executive functioning and verbal comprehension.

Flanker task (Zelazo et al., 2013). Inhibitory control was measured with a standard computerized flanker task. The child looked at a computer screen and used a simple response box keyboard with left and right arrow buttons. On the computer screen, five red arrows were presented in a horizontal line at the center of the screen. The child

was instructed to press the button on the response box that matched the direction of the target middle arrow displayed on the screen (irrespective of the direction of the other arrows). During congruent trials, all of the arrows pointed the same direction (e.g., →→→→→); during incongruent trials, the four flanker arrows pointed a different direction (e.g., →→←→→). The child completed four practice trials, followed by two blocks of 25 test trials, each with 16 congruent and 9 incongruent trials presented in fixed pseudorandom orders (with 1-3 congruent trials preceding each incongruent trial). Flanker interference was identified in this task as the difference between the mean reaction times on incongruent and congruent trials. The difference variable is a measure of the extra processing cost caused by inhibiting the conflicting flanker arrows and thus used as the indicator of inhibitory control.

After completing the first two blocks on the flanker task, a task-switching component was presented, in which the child was instructed to match the direction of the middle arrow if the arrows were red (consistent with instructions for the first two blocks); however, if the arrows on the screen were yellow, they were instructed to press the button corresponding with the direction of the outside four arrows (instead of the middle arrow). This task required the child to shift attention as the rules changed between trials. Children completed 6 practice trials, followed by two blocks of 25 test trials, half red and half yellow. To calculate the switch cost as an indicator of task-switching, the difference was found between the mean reaction time on incongruent trials during the first two blocks (without switching) and the reaction time on incongruent trials during the latter two blocks (with switching). As mentioned above, data are missing for three children on this task due to feasibility.

Trail Making Test (Spreeen & Strauss, 1998). Task-switching was also assessed with a Trail Making task in which the child connected dots on a page. In part A, the child was instructed to connect consecutive numbers (i.e., 1, 2, 3, 4, etc.) on the test sheet using a pen. In part B, the child was instructed to connect dots by switching between consecutive numbers and letters (i.e., 1, A, 2, B, 3, C, etc.). If the child made an error, the experimenter gave corrective feedback. The number of seconds to complete each task as well as the number of errors were recorded for parts A and B. The number of seconds to complete part A (an indicator of processing speed) was subtracted from the number of seconds to complete part B (i.e., the switch cost) to generate the indicator of task-switching on this task.

Digit span (Wechsler Intelligence Scale for Children - Fourth Edition; WISC-IV). Working memory was assessed following the standard procedure for the digit span subtest of the WISC-IV. The experimenter read aloud a series of digits progressively increasing in length (from 2 to 9 digits) that the child was instructed to repeat in the same order (Digit Span-Forward) or backwards (Digit Span-Backward). For each task, trials continued until the child failed both trials in a block or completed the final block in the task. The task was scored for total number of correct trials.

Peabody Picture Vocabulary Test (PPVT-IV). In this standardized measure of receptive vocabulary, the experimenter says a series of words and the child indicates the picture that best represents each word from a set of four pictures. A baseline was established when the child completed a full set of words with one or zero errors. The difficulty of the vocabulary increases with each successive set. Trials continued until the

child made eight or more errors within a set or completed the final set. Standardized scores were calculated and used as an indicator of verbal comprehension.

Results

One of the many goals of this study was to evaluate creativity tasks for differences between social and non-social forms of creativity. It was hypothesized that a correlational pattern would emerge such that measures with social content would be most strongly correlated with each other (including reports of imaginary companions and paracosms), while object-focused or abstract measures of creativity would be most strongly correlated. For the longitudinal aspect of this study, I hypothesized that indicators of social creativity at Time 1 would predict scores on creativity measures at Time 2 and that the effects would specifically be largest for measures that included social content. Furthermore, exploratory and qualitative analyses were conducted to examine the developmental links between engaging in elaborated role play at Time 1 and creating paracosms at Time 2. In addition, I hypothesized that the measures of creativity would be related to reports of adaptive coping as well as other measures of psychosocial adjustment. Finally, analyses were conducted to explore the relation between creativity and aspects of executive functioning. Given the relatively small sample size, all available data were included in analyses rather than remove cases with missing data.

Creativity

Descriptive statistics for the laboratory measures of creativity are presented in Table 8. Of the measures, girls were rated as significantly more creative on the drawing task ($M = 3.63$, $SD = 1.10$) than boys ($M = 2.67$, $SD = .92$; $t(38) = 3.00$, $p = .005$) and verbal comprehension was related to creativity ratings on the tails task ($r = .33$, $p = .04$).

There were no other differences among the creativity measures as a function of gender, verbal comprehension, or age. In examining the creativity measures individually, the narrative task emerged as a particularly good measure, as it was not related to gender, age, or verbal comprehension, but did appear to be somewhat related to all of the other measures of creativity (see Table 9).

Table 8. *Creativity Measure Means, Standard Deviations, and Range of Scores.*

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	Range
Narrative task	38	2.81	1.16	1.00-5.00
Drawing task	40	3.13	1.11	1.00-5.00
Collage task	40	2.86	.95	1.00-4.33
Unusual uses task	41	3.67	.85	2.00-5.00
Tails consequences task	40	3.53	.61	2.33-5.00
Making friends task	40	3.34	.65	1.67-4.67

In order to explore the hypothesis that social creativity is a distinct domain (as compared to object-focused forms of creativity), partial correlations were conducted to examine the relations between the laboratory measures of creativity, controlling for gender, age, and verbal comprehension (see Table 9). A difference between measures with social content and measures without social content did not emerge across the board. However, for the divergent thinking tasks, the two measures that included social content were related to each other, while neither of these were related to the divergent thinking task without social content (i.e., the unusual uses task). For the measures that involved generating products (i.e., a collage, a set of drawings, and a narrative), all three measures

were correlated, suggesting that perhaps they were more similar to each other in ways that led the social content to be less salient.

Table 9. *Correlations among Creativity Measures at Time 2 (Controlling for Gender, Age, and Verbal Comprehension)*

	1.	2.	3.	4.	5.	6.
1. Narrative task	-					
2. Drawing task	.37*	-				
3. Collage task	.42*	.51**	-			
4. Unusual uses task	.30 ^t	.28 ^t	.21	-		
5. Tails consequence task	.31 ^t	.06	.08	.13	-	
6. Making friends task	.26	.19	.06	.05	.34*	-

^t $p < .10$

* $p < .05$

** $p < .001$

Given the overlap between the three product measures and the need for parsimony, a composite was constructed by converting the drawing, collage, and narrative creativity measures into standardized z-scores and then calculating the mean to create the variable “product creativity.” For the five children with missing data for one of the creativity measures, the mean was calculated using the two measures that were available. The product creativity composite was related to gender, with girls having higher levels of creativity than boys ($t(39) = -2.19, p = .04$). The product creativity composite was not related to age or verbal comprehension.

In addition, given that the two measures of the social divergent thinking tasks (i.e., tails and making friends) were correlated they were combined into a composite to

represent social divergent thinking. The social divergent thinking composite was not related to gender, age, or verbal comprehension. As the unusual uses task was not significantly related to any of the individual measures of creativity, it was kept separate as a measure of divergent thinking without social content. The unusual uses task (while not related to individual measures) was correlated with the product creativity composite ($r = .36, p = .03$), while social divergent thinking was not related to the unusual uses task ($r = .14, ns$) or product creativity ($r = .19, ns$).

Imaginary Companions

Among the 41 children in the sample, 24 (59%) reported imaginary companions at Time 2. Four children (17% of children with imaginary companions) described the imaginary companion as a current activity (2 invisible friends, 2 personified objects), while 20 (83%) indicated that interacting with an imaginary companion was something they did in the past (10 invisible friends, 10 personified objects). The 10% of children within the sample reporting current imaginary companions is consistent with other studies examining the imaginary companions of older children and adolescents (see Pearson et al., 2001; Taylor, Hulette, & Dishion, 2010). However, 49% of children reporting a past imaginary companion is a higher rate than previous studies (e.g., Pearson et al. found 26% of 12-year-olds reported past imaginary companions; Taylor et al., found 20% of adolescents to have past imaginary companions). This result is partly due to asking some children about a specific imaginary companion that was described at Time 1 and they might not have remembered without the specific prompt; however, of the children who were identified as having imaginary companions at Time 2 there were only two children who did not describe an imaginary companion prior to the prompted

question. It is possible that there was selection bias within the sample as families were informed prior to participation that the study was about children's imagination. Families that held stronger values regarding children's imagination might have been more interested in participating. While not significant, the subsample from Time 1 that participated at Time 2 did include a larger proportion of children who had imaginary companions at Time 1 (58%) than the full sample (46%). Imaginary companion status was not related to gender, verbal comprehension, or age.

To explore the continuity of having imaginary companions over time, the children's reports from the two time points were compared. As can be seen in Table 10, children ranged considerably in whether they remembered the imaginary companions they described at Time 1, from not at all to spontaneously recalling the same imaginary companion with consistent detail. Furthermore, some children's descriptions at Time 2 suggested that a specific imaginary companion had been important to the child for years, while for other children the imaginary companion appeared to be more short-lived with some imaginary companions being replaced with new imaginary companions and some simply forgotten.

Given the high frequency of imaginary companions at either time point (76%), for analyses of Time 2 data, only the 24 children (59%) who described imaginary companions at Time 2 were compared to the 17 children (41%) who did not report imaginary companions at Time 2. Controlling for the effects of gender, age, and verbal comprehension, the children with imaginary companions scored higher than children without imaginary companions on the product creativity composite ($F(1, 36) = 13.02, p = .001, \eta^2 = .27$) as well as the unusual uses task ($F(1, 36) = 4.36, p = .04, \eta^2 = .11$).

Table 10. *Frequencies of Imaginary Companions (IC) for Children Who Participated at Time 1 and Time 2*

		Time 2			
		No IC	Past IC	Current IC	Total
Time 1	No IC	10	4	2	16
	Has IC	7	16 ^a	2 ^b	25
	Total	17	20	4	41

^a Of these 16 children, 7 described the same imaginary companion that they described at Time 1, 7 remembered the previous imaginary companion with a prompt (5 of whom also described a different past imaginary companion), and 2 described a different past imaginary companion with no memory of the imaginary companion described at Time 1.

^b Of these 2 children, 1 described the same imaginary companion that was described at Time 1, and 1 described a different imaginary companion than the one described at Time 1 but remembered the previous imaginary companion with a prompt.

There was no significant difference for social divergent thinking ($F(1, 36) = 1.33, p = .26$). However, for the children who generated imaginary companions, the creativity ratings of the imaginary companions were related to social divergent thinking ($r = .69, p = .001$). Whereas the creativity ratings of imaginary companions were not related to the product creativity composite ($r = -.05, ns$) or the unusual uses task ($r = .32, ns$). Taken together, it appeared that children who reported imaginary companions at Time 2 were generally rated as more creative than the children without imaginary companions on the laboratory measures and that the creativity ratings of the imaginary companions were also related to some measures of creativity. However, the hypothesis that having imaginary companions would be primarily related to measures of social creativity was not supported

with the pattern of results. See Table 11 for creativity scores as a function of imaginary companions.

Table 11. *Creativity Measure Means and Standard Deviations as a Function of Having an Imaginary Companion (IC)*

Variable	Total	No IC	IC
n	41	17	24
Product creativity	.03 (.80)	-.49 (.76)	.39 (.62)
Social divergent thinking	-.02 (.81)	-.19 (.75)	-.02 (.81)
Unusual uses task	3.67 (.85)	3.37 (.96)	3.89 (.71)

Paracosms

Of the 41 children in this study, 6 (15%) described paracosms. This prevalence is similar to what we have found (17%) in other research with 8- to 12-year-olds (Taylor et al., in prep). Of the children with paracosms, 4 described the paracosm as a current activity, while 2 reported that the paracosm was a past activity. All 6 of the children with paracosms also described imaginary companions (4 invisible friends, 2 personified objects), 2 of the imaginary companions were described as current at Time 2 and 4 were past imaginary companions (that had also been described at Time 1).

Because there were only 6 children with paracosms in this study it is not particularly surprising that there were not significant differences on laboratory creativity measures as a function of having a paracosm. However, the children with paracosms did have high scores on the creativity measures (see Table 12), which suggests that a larger sample might have replicated the finding that children with paracosms received higher scores on measures of social creativity than children without paracosms.

Table 12. *Creativity Measure Means and Standard Deviations as a Function of Having a Paracosm*

Variable	Total	No Paracosm	Paracosm
n	41	35	6
Product creativity	.03 (.80)	-.05 (.82)	.46 (.57)
Social divergent thinking	-.02 (.81)	-.12 (.81)	.57 (.49)
Unusual uses task	3.67 (.85)	3.60 (.86)	4.11 (.69)

Longitudinal Analyses

Controlling for gender, age, and verbal comprehension, neither of the laboratory measures of creativity at Time 1 (i.e., narrative task and drawing task) were related to any of the laboratory measures of creativity at Time 2 (see Table 13), nor were they related to having an imaginary companion at Time 2 ($F(1, 35) = .15, ns$; $F(1, 25) = 2.40, ns$; respectively). In addition, simply engaging in elaborated role play at Time 1 was not related to any of the creativity measures at Time 2.

However, the creativity ratings of children's role play characters (for children who engaged in elaborated role play) at Time 1 were significantly correlated with product creativity ratings as well as social divergent thinking tasks eight years later at Time 2, and there was a trend for it to be related to the unusual uses task. In addition, role play creativity ratings at Time 1 were related to describing an imaginary companion at Time 2 ($F(1, 24) = 6.12, p = .02, \eta^2 = .20$) as well as the creativity ratings of imaginary companions at Time 2.

Table 13. *Correlations between Measures of Creativity at Time 1 and Time 2 (Controlling for Gender, Age, and Verbal Comprehension)*

		Time 1		
		Narrative task (n=41)	Drawing task (n=31)	Role play creativity (n=30)
Time 2	Product creativity (n=41)	.02	.19	.45*
	Social divergent thinking (n=41)	-.01	.15	.56*
	Unusual uses task (n=41)	-.05	-.11	.38 †
	Imaginary companion creativity (n=24)	.26	.01	.54*

† $p < .10$

* $p < .05$

Coping and Psychosocial Adjustment

None of the summary scores for the autism quotient, strengths and difficulties questionnaire, grit, or coping were related to gender, age, or verbal comprehension. See Table 14 for descriptive information about these measures. As can be seen in Table 15, the parent report measures that assessed children’s psychosocial adjustment (including the strengths and difficulties questionnaire, the grit scale, and the autism quotient) were all significantly correlated. However, none of the parent measures were correlated with the children’s reports of coping strategies. It is possible these diverging results related in part to differences between parent and child report, as coping strategies were reported by the children while the other measures were reported by parents. Given the overlap

between parent report measures of psychosocial adjustment in addition to exploratory analyses that did not identify meaningful distinctions between the measures or respective subscales, total scores from the strengths and difficulties questionnaire, autism quotient, and grit were combined into a composite to represent child psychosocial adjustment (grit total was reverse-scored to be consistent with other measures). This composite was not related to gender, age, or verbal ability.

In this study, Active Coping Strategies and Support Seeking Strategies were strongly correlated, whereas neither of these scales were related to Avoidant Strategies. In contrast, Distraction Strategies was related to both Active Coping Strategies as well as Avoidant Strategies. See Table 15. This pattern is consistent with previous studies showing that Active Coping Strategies and Support Seeking Strategies tend to both correspond with positive outcomes, while Avoidant Strategies tend to be related to negative outcomes, and Distraction Strategies have mixed results with outcomes. (Ayers, 1991; de Boo & Wicherts, 2009; Sandler, West, & Tein, 1994).

As can be seen in Table 16, none of the measures of creativity at Time 1 or Time 2 were significantly related to psychosocial adjustment. Similarly, there were no significant correlations between creativity measures at Time 2 and coping strategies. However, exploring the potential longitudinal relation between early measures of creativity and later coping strategies demonstrated that narrative creativity at Time 1 was related to active coping and distraction strategies at Time 2. Drawing creativity ratings and role play creativity ratings at Time 1 were not related to coping.

Table 14. *Coping and Psychosocial Adjustment Means, SDs, and Range of Scores*

	<i>n</i>	<i>M</i>	<i>SD</i>	Range
Coping strategies				
Active coping strategies	40	2.73	.49	1.46-3.63
Support seeking strategies	40	2.41	.57	1.13-3.55
Avoidant strategies	40	2.48	.41	1.67-3.50
Distraction strategies	40	2.25	.48	1.10-3.10
Strengths and Difficulties				
Total difficulties	39	7.85	6.53	0-28
Externalizing scale	39	3.97	4.00	0-13
Internalizing scale	39	3.87	3.73	0-17
Prosocial behavior scale	39	8.23	2.13	1-10
Autism Quotient (AQ)				
Total AQ	38	61.94	9.30	43-80
Social skills	38	10.11	4.15	3-18
Communication	38	12.50	3.42	7-20
Attention-switching	38	12.78	3.66	5-21
Attention to detail	38	17.50	2.91	13-23
Imagination	38	9.05	2.80	5-16
Grit				
Total grit	39	3.43	.78	2.08-4.83
Consistency of interests	39	3.29	.86	1.83-4.83
Perseverance of effort	39	3.58	.79	1.67-4.83

Table 15. *Correlations among Psychosocial Adjustment and Coping Measures (Controlling for Gender, Age, and Verbal Comprehension)*

	1.	2.	3.	4.	5.	6.
1. Strengths and difficulties total	-					
2. Autism quotient total	.43*	-				
3. Grit total	.66*	.36*	-			
4. Active coping	-.11	-.08	.04	-		
5. Support seeking	-.06	.03	-.06	.57**	-	
6. Distraction	.01	-.08	.15	.48*	.24	-
7. Avoidant coping	.11	-.03	.13	-.03	.05	.33*

Note. Strengths and difficulties total and autism quotient total were reverse-scored for ease in interpretability.

* $p < .05$

** $p < .001$

16. *Correlations between Measures of Creativity and Psychosocial Adjustment and Coping (Controlling for Gender, Age, and Verbal Comprehension)*

	Time 1			Time 2			
	Narrative task (n=41)	Drawing task (n=31)	Role play creativity (n=30)	Product creativity composite (n=41)	Social divergent thinking (n=41)	Unusual uses task (n=41)	Imaginary companion creativity (n=22)
Psychosocial adjustment (n=39)	-.14	-.05	-.29	.10	-.32 ^t	.05	-.09
Active coping strategies (n=40)	.43*	.14	.34 ^t	.18	.14	.26	.10
Support seeking strategies (n=40)	.09	.10	.24	.18	.01	.30 ^t	-.08
Distraction strategies (n=40)	.36*	.23	-.17	-.12	-.18	-.09	-.09
Avoidant strategies (n=40)	.27	-.05	-.10	.14	-.06	.28 ^t	.17

^t $p < .10$

* $p < .05$

Executive Functioning

Of the measures of executive functioning, age was positively correlated with digit span total ($r = .33, p = .04$) and verbal comprehension was correlated with task switching ($r = .37, p = .02$). See Table 17 for descriptive information about executive functioning measures. There were no other differences in executive functioning measures as a function of gender, age, or verbal comprehension. As can be seen in Table 18, working memory was related to inhibitory control and there was a trend for the two task-switching measures to be correlated. However, only one measure of executive function (task-switching on the Flanker task) was related to any of the creativity measures (social divergent thinking task) at Time 2 (see Table 19).

Table 17
Executive Function Means, Standard Deviations, and Range of Scores

	<i>n</i>	<i>M</i>	<i>SD</i>	Range
Inhibitory control (Flanker) (Cost in msec)	37	57.1	37.7	-38-145
Task-switching (Flanker) (Switch cost in msec)	38	441.9	184.9	80-910
Task-switching (Trail making) (Switch cost in sec)	41	32.02	14.35	7-68
Working Memory (Digit span-total)	41	16.29	3.67	9-26

Table 18. *Correlations among Measures of Executive Functioning (Controlling for Gender, Age, and Verbal Comprehension)*

	1.	2.	3.	4.
1. Inhibitory control (Flanker)	-			
2. Task-switching (Flanker)	-.10	-		
3. Task-switching (Trail making)	-.15	.32 ^t	-	
4. Working memory (Digit span)	.42*	.18	.18	-

Note. Inhibitory control and both task-switching measures were reverse-scored for ease in interpretability (i.e., for all four measures, higher scores correspond with increased ability on that measure)

^t $p < .10$

* $p < .05$

Correcting for Multiple Analyses

When alpha levels are adjusted with a Bonferroni correction for multiple analyses, most of the analyses do not remain significant. However, the pattern of correlations could be useful for guiding future research.

Discussion

Creativity

One of the goals of this study was to explore the relations among a large battery of creativity measures. Within this sample, tasks that involved generating a product (i.e., a drawing, a collage, and a narrative) appeared to be different from divergent thinking tasks. Furthermore, divergent thinking tasks that included social content (i.e., how the world would be different if people had tails, ways to make new friends) appeared distinct from a standard non-social divergent thinking task that is focused on object manipulation (i.e., uses for a brick).

Table 19. *Correlations between Measures of Executive Functioning and Creativity Measures (Controlling for Gender, Age, and Verbal Comprehension).*

	Time 1			Time 2			
	Narrative task (n=41)	Drawing task (n=31)	Role play creativity (n=30)	Product creativity composite (n=41)	Social divergent thinking (n=41)	Unusual uses task (n=41)	Imaginary companion creativity (n=22)
Inhibitory control (Flanker) (n=38)	-.01	.31	-.04	.20	.07	.22	-.30
Task-switching (Flanker) (n=38)	-.11	-.17	-.14	.14	-.39*	.01	-.12
Task-switching (Trail making) (n=41)	-.10	-.04	.03	-.04	-.28	-.20	-.30
Working memory (Digit span) (n=41)	.07	.21	-.31	.17	-.22	.10	-.19

Note. Inhibitory control and both task-switching measures were reverse-scored for ease in interpretability (i.e., for all four measures, higher scores correspond with increased ability on that measure).

* $p < .05$

The pattern of the divergent thinking tasks corresponds with other recent research that has shown that creativity measures with social content tend to correspond with each other, but not with other creativity measures focused on object-manipulation or abstract content (Taylor et al., in prep). However, a similar pattern was not found with creativity measures that involved generating a product. While both of the product generation tasks that involved social content (i.e., generating a narrative about two characters, drawing a real person and an imaginary person) were related to each other, they were also both related to creativity on a task with abstract content (i.e., collage). It is not particularly surprising that the collage task and the drawing task would be related, given that both are primarily visual-spatial tasks. It is less clear why the collage task was related to the narrative creativity task as the only real similarity is that both tasks required the child to create a product. Taken together, these findings suggest that generating a single product is potentially different from generating multiple ideas for a given prompt and might have differential implications for creativity in other contexts, reflecting different domains of creativity or other aspects of the creative process.

Another goal of this study was to examine the laboratory measures of creativity in relation to creative activities that children engage in outside the laboratory. I found that having an imaginary companion at Time 2 was related to several laboratory measures of creativity, providing further evidence to suggest that imaginary companions are reflective of children's creativity. Furthermore, the creativity ratings of the imaginary companions were related to higher creativity ratings on the social divergent thinking tasks. In addition, all of the children with paracosms also reported imaginary companions at Time 2, which provides some support for the claim that both are reflective of a more general

propensity to engage in imaginative behaviors. However, the sample in this study was too small to fully assess the degree to which having a paracosm was related to other aspects of creativity. While differences were not significant, children with paracosms did receive high scores on the laboratory measures of creativity which is consistent with other research that has demonstrated having a paracosms is related to laboratory measures of creativity (Taylor et al., in prep).

Longitudinal Analyses

In examining the longitudinal relations between indicators of creativity at Time 1 and Time 2, the strongest predictor of later creativity indicators (including all of the laboratory measures and generating later imaginary companions) was the creativity ratings of children's role play characters at Time 1. It is interesting that this finding emerged while narrative creativity and drawing creativity at Time 1 were not predictive of later performance on similar laboratory measures of creativity. One possible explanation for these differences is that performance on the laboratory measures at Time 1 were one-time behaviors that could be influenced by transitory factors (e.g., how tired the child happened to be), whereas the interviews of elaborated role play might have been more reflective of a stable behavior that is spontaneously generated (rather than prompted) and sustained over time.

However, while simply engaging in elaborated role play at Time 1 was related to laboratory measures of creativity at Time 1, it was not related to performance on any of the laboratory measures of creativity at Time 2. Rather, it was specifically generating role play characters that were rated as more creative that predicted later performance on creativity measures. It is possible that engaging in elaborated role play is not always

reflective of creativity as some characters are rather mundane (e.g., an invisible girl who is based on a real girl, a beloved stuffed animal with ordinary characteristics, re-enacting a favorite movie character), whereas for other children, role play might be a metaphorical blank canvas with which to design unique characters, potentially reflective of a more stable proclivity towards creative behavior. It is also possible that characters that were rated as the most creative were the most detailed, potentially reflecting the frequency and longevity of the activity, rather than the particular creativity of the activity.

Psychosocial Adjustment and Coping

Psychosocial adjustment was not related to any of the indicators of creativity at Time 1 or Time 2. There was some indication that coping strategies might be related to creativity (i.e., unusual uses task at Time 2, narrative task at Time 1), however, given that there was not a more robust pattern of findings, these have limited implications. In particular, it is counterintuitive for support seeking strategies to be related to the unusual uses task but not any of the other creativity measures. The finding that creativity ratings for the narrative task at Time 1 was related to active coping and distraction strategies at Time 2 is interesting in that it suggests that the ability to generate creative narratives at an early age might be beneficial in developing specific strategies to cope with challenges later in life. However, this finding should be considered exploratory and primarily used for informing future research.

The weak findings with coping strategies and psychosocial adjustment might be related to issues with relying on reports from parents and children. It is possible for parents and children to provide positively biased reports of children's behaviors. Another possibility is that creativity and coping are related, but primarily for stressed or clinical

populations. For children growing up in middle-class households with few major stressors the relation between creativity and coping might simply be less relevant. Examining these possibilities with behavioral measures of coping skills and psychosocial adjustment as well as with children who have experienced more significant stressors would shed additional light on this topic. Furthermore, while the findings did not provide strong support for the psychosocial benefits of creativity, there was also not evidence to suggest that creative or imaginative children were more likely to be struggling.

Executive Functioning

In this study, I did not find any connections between measures of executive functioning and indicators of creativity. One possible explanation for these null results is that the relation between creativity and aspects of executive functioning is too complex to easily detect with a small sample. Creativity emerges through a process that unfolds via preparation, incubation, illumination, and verification (Wallas, 1926), in addition to several additional factors that have been proposed as important for the creative process (see Sawyer, 2012). It is possible that different executive functions are more or less relevant at any given point within the process. For instance, decreased inhibition might be really useful in generating novel solutions, while increased inhibitory control might be helpful in seeing a solution through to completion. If the relation is nuanced in this way, it would not be surprising to have null results, as the effects could potentially cancel each other out. Future research in this area would likely benefit from more closely examining executive functioning skills at different times during the creative process within larger samples to better detect such nuanced results.

While there are potential relations between the measures of creativity and executive functioning that were not detected in this study, it is worth noting that it is unlikely that creativity is simply an extension of executive functioning or other general cognitive abilities. In this research measures of creativity appeared to generally be unrelated to executive functioning, verbal comprehension, and age.

Conclusion

This study explored children's creativity with a longitudinal follow-up of preschool-age children eight years later when the children were in middle school. The findings suggest that some early indicators of creativity are predictive of later creativity. In particular, the creativity of children's role play characters appear to be related to later measures of creativity. While a causal claim cannot be made, these correlations suggest that role play is not simply a cute and entertaining activity of early childhood, as it appears to be related to performance on measures of creativity in both early and later childhood.

CHAPTER IV

GENERAL DISCUSSION

The goals of this dissertation were: 1) to develop measures that could effectively be coded for creativity in children; 2) to assess the degree to which measures of social creativity reflect a distinct domain of creativity; 3) to examine the degree to which laboratory measures of creativity correspond with creative behaviors that children engage in outside of the laboratory (i.e., elaborated role play and paracosms); 4) to examine the developmental continuity of indicators of creativity from preschool age to middle school age; 5) to explore the degree to which creativity is related to coping, psychosocial adjustment, and executive functioning; and 6) to collect qualitative information about children's paracosms to explore how these are related to earlier elaborated role play.

Measuring Creativity

Creativity is a construct that crosses disciplines and spans the masterpieces of history to the products of everyday life, but its measurement is often reduced to "What are all the uses that you can think of for a brick?" While divergent thinking tasks are likely useful for understanding some aspects of creativity, concerns have been raised in recent years regarding their use (see Sawyer, 2012; Silvia et al., 2008). In particular, the practice of equating creativity with performance on a single divergent thinking task limits our view (Amabile, 1996; Runco, 2008).

At Time 2, the unusual uses task was not significantly related to any of the other laboratory measures of creativity, suggesting that it neither fully captures creative potential nor is it necessarily the best measure of creativity for this population. Instead, the results from Time 2 suggested that creating a product such as a story, drawing, or

collage might reflect a different ability than generating multiple ideas for a divergent thinking task. In addition, performance on divergent thinking tasks that involved social content (i.e., tails and making friends) was not related to the classic unusual uses task that focuses on object manipulation. These findings point to the importance of incorporating varying measures of creativity to develop a richer understanding of creativity in its varying dimensions, rather than relying on a single measure that potentially oversimplifies and overgeneralizes creativity.

In this research, I used the consensual assessment technique, in which participants generate a product that is later subjectively rated for creativity by a group of appropriate judges. I used this method to assess the creativity of stories, drawings, collages, imaginary companions, and responses generated for the divergent thinking tasks. Despite receiving less attention than the assessment of uniqueness, this technique flexibly allows for developing tasks that can be easily accessible for children and adapted to include a range of content in various domains (e.g., the social domain). The consensual assessment technique can even be employed with the responses generated from standard divergent thinking tasks (as was done in the present study). This type of assessment offers a number of advantages over traditional scoring for divergent thinking tasks, including that it is similar to how creativity is judged in the real world, it avoids the challenges of defining creativity by letting judges use their own intuitions about creativity, and also does not have the methodological problems of uniqueness scoring (Amabile, 1996; Silvia et al., 2008).

However, many researchers continue to prefer using divergent thinking tasks with standard scoring procedures. One reason for this preference might be related to the

argument that uniqueness scoring is an *objective* measure of creativity, whereas the consensual assessment technique is *subjective*. However, standard scoring for uniqueness actually involves several *subjective* components (see Amabile, 1996). For example, coders have to categorize responses, which include making decisions such as whether using a brick to “build a house” is the same idea or different from using a brick to “build a building”. Both ideas involve using the brick for the purpose of building a structure, however, the ideas could refer to different structures and if the coders decide that they are different ideas, one or both of the ideas could be counted as “unique” if not listed by other participants. In addition, coders decide if responses are “inappropriate”. For example, at Time 2, one child suggested that “you can bang it [the brick] against your head to get ideas.” Given that in reality, banging one’s head against a brick is unlikely to yield insightful revelations, the idea might simply be removed if it were included in another study. However, the idea could be coded as “appropriate” if the coder decided to include responses that he or she considered to be funny or ironic.

It is interesting that despite the subjective features of uniqueness coding, studies that use uniqueness rarely report reliability statistics, suggesting that the data were likely only coded by one individual. At Time 2, the unusual uses ideas were coded for uniqueness by two coders with 86% overlap reliability. This reliability is good, but it is certainly not perfect and supports the claim that uniqueness coding is not fully objective. Given the subjective qualities of uniqueness coding combined with the other problems of this procedure, it is unclear why this method is considered superior to other measures of creativity and reiterates the benefits of shifting to consensual assessment measures instead. For both Time 1 and Time 2 in this study, the consensual assessment technique

yielded high reliability across coders and the tasks appeared to be enjoyable and engaging for the children.

Correlates of Creativity

Pretend play. Creativity was assessed with measures that varied in whether children completed a single product, generated numerous ideas, or described pretend play activities that they engaged in outside of the laboratory. At Time 1 when the children were preschool age, I found that two laboratory measures of creativity with social content were related to each other and to elaborated role play. With a follow-up study of these children eight years later, generating characters in their pretend play that were regarded as highly creative at Time 1 was predictive of creativity measures at Time 2.

The relation between performance on creativity tasks and elaborated role play contrasts with Lillard et al.'s (2013) claim that there is no compelling evidence that creativity is related to pretend play. However, the studies that Lillard et al. reviewed all included divergent thinking tasks using standard scoring procedures that in my view are problematic for research with young children. Another possibility for the discrepancy between Lillard et al.'s claim and the findings of this dissertation is that most of the indicators of creativity in my research that were related to role play included social content. Lillard et al. do not make a distinction between creativity and pretend play tasks that involve social content and those that do not, but most of the studies reviewed only included measures for both pretend play and creativity that involve non-social content. To my knowledge, research in the Imagination Lab at the University of Oregon, including this dissertation, is the first to investigate the relation between socially-oriented

pretend play (e.g., interactions with an imaginary companion) and creativity tasks that involve social content (e.g., completing a story about two children in the woods).

Although our past research showed a clear distinction between social and nonsocial creativity, the results of Time 2 of this study caution against over-stating this result. With the assessment at Time 2, I hypothesized that creativity measures with social content would emerge as distinctly different from the other measures of creativity. Creativity ratings for the divergent thinking tasks showed some support for this hypothesis. The “tails” consequences task and the “making friends” tasks were related to each other, while neither of these measures were related to the unusual uses for a brick task. However, a similar pattern was not observed for the product creation tasks. All three of these measures were correlated with each other.

One possible explanation is that the product creation tasks were similar to each other in ways that made potential differences in social content less salient. In addition to whether or not they involved social content, the tasks varied in the degree that they included fantasy content and in the types of activities and skills that, arguably, could be related to different domains (e.g., verbal domain/visual-spatial domain).

The finding that there were differential correlation patterns among the measures of creativity is consistent with a domain specific view of creativity in which being creative within one domain does not necessarily mean an individual will be more creative in other domains. In contrast, the finding that all of the creativity measures had similar patterns of results with the other variables in this study corresponds more closely with a domain general perspective of creativity that suggests there are core features of creativity that cut across different domains. Rather than providing clear evidence to support either

perspective, this study demonstrates the tension and nuance between the two perspectives and highlights the importance of integrating both perspectives in future models of creativity. While some batteries of creativity tasks have been developed to assess different domains of creativity (most frequently verbal and visual-spatial tasks), even in heavily-used, large batteries like Torrance's Tests of Creative Thinking, there are rarely tasks with social content or alternatives to divergent thinking tasks.

Coping and psychosocial adjustment. This study also explored the ways in which creativity might be related to coping strategies and psychosocial adjustment. There was very limited evidence that either psychosocial adjustment or coping might be related to any aspect of children's creativity. One explanation for the general lack of findings with psychosocial adjustment and the coping measure could be related to the relatively low levels of stress experienced by the families who participated in this study. It is also possible that the small sample size for Time 2 simply limited the statistical power to detect a relation. Replication with a larger sample of children who have experienced more significant stressors is needed to clarify these possibilities. In addition, examining coping skills with behavioral measures that allow for more direct observations would be beneficial for future research. While this study did not find compelling evidence to support the hypothesis that creativity is related to adaptive coping strategies, there also was not evidence to suggest that children's creative behaviors and activities were a sign of concern. It is possible that creative activities and behaviors are simply independent of psychosocial adjustment and coping abilities, representing different aspects and experiences in life.

Executive functioning. Time 2 also explored the relation between creativity and measures of executive functioning, including inhibitory control, task-switching, and working memory. Task-switching on the flanker task was related to the social divergent thinking measures, however there were no other significant relations between indicators of creativity. The goal of this study was to explore different theories about potential correlations between these constructs. For example, is creativity simply a cognitive ability that would be positively correlated with measures of executive functioning? Perhaps only certain aspects of executive functioning, such as task-switching, are particularly beneficial for creativity? Or in contrast, many some executive functions, namely inhibitory control, would be negatively correlated with creativity? In this study, patterns did not emerge to support any of these claims.

While there were not meaningful patterns between executive functioning and measures of creativity found, it is possible that the relation between the two is complex and nuanced such that different executive functions might enhance or hinder creativity in different domains or different points in the creative process. With only 41 participants at Time 2, there was a lack of statistical power to detect smaller effects that could be rather complex. Research with larger samples will be beneficial in disentangling these possibilities. I am currently examining the data collected from a larger sample of children that will hopefully prove insightful in understanding the relation between aspects of executive functioning and creativity (Taylor et al., in prep).

However, in the current study there was not a pattern to suggest that executive functioning is strongly related to creativity. It is possible that the two constructs are not connected. In a related area of research, there is debate over the degree to which

intelligence is related to creativity. Kim (2005) conducted a meta-analysis on the topic and found that there was at best a modest relation between intelligence and creativity suggesting that the two constructs are relatively independent. However, Silvia (2015) has challenged this position by pointing out the methodological flaws of previous studies using uniqueness scoring as a proxy for creativity. In addition, other findings suggest that the relation depends on the scope, such that at the lower end, intelligence is strongly correlated with creativity (such that basic skills and knowledge are likely necessary for creativity to occur), but that above average intelligence is not necessarily related to higher creativity (Batey & Furnham, 2006). While the present study did not include a full IQ battery, the findings for executive function and verbal comprehension correspond most closely with the position that creativity is not simply part of a more general cognitive ability.

The Development of Creativity

An important aim of this study was to examine the degree to which indicators of creativity at Time 1 were predictive of creativity measures eight years later. Much of the previous research that indicates a connection between creative activities early in life and later creativity has focused on retrospective reports of childhood activities, with findings suggesting that some early creative behaviors that adults remember might have meaningful consequences for adult creativity (Hill & Clark, 1998; Kidd, Rogers, & Rogers, 2010; Root-Bernstein & Root-Bernstein, 2006; Schaefer, 1969; Taylor, Hodges, & Kohanyi, 2003). However, retrospective reports are limited in that they rely on participants' memories of childhood behaviors, which can be prone to biases. For instance, an alternate explanation for studies in which creative adults and adolescents

retrospectively report imaginary companions and paracosms is that these individuals might simply be more likely to *remember* engaging in earlier creative activities, as memories of these types of behaviors might be more salient and consistent with an adult self-image of being a creative individual rather than a self-image that is less tied to creativity (Hill & Clark, 1998). An additional weakness of retrospective reports is that they are often unable to provide the level of specificity that is desirable for understanding childhood behaviors. For these and other reasons, it is important to assess children's creative activities and performance on measures of creativity during childhood and examine how these are related to later performance on measures of creativity.

While there have been several longitudinal studies of children's creativity, they have primarily relied on solely standard divergent thinking tasks to assess creativity and have not included assessment during the preschool years (see Claxton, Pannells, & Rhoads, 2005).

The present research aimed to add to the above research by including measures with social content as well as incorporating alternatives to standard divergent thinking tasks and procedures. I hypothesized that the laboratory measures of creativity at Time 1 would be predictive of later creativity at Time 2 but there was no evidence for this prediction. Neither the narrative creativity task or drawing task at Time 1 were related to any of the indicators of creativity at Time 2. However, there was one measure from Time 1 that was significantly related to most of the creativity measures at Time 2 eight years later (product creativity, social divergent thinking, having an imaginary companion, and a trend with the unusual uses for a brick task) – the creativity ratings of the role play characters described at Time 1. It is possible that the description of a creative role play

character in an interview is a reliable measure of creativity because children are describing behaviors that are spontaneously generated and sustained over time. In contrast, in the laboratory measures of creativity at Time 1 children were responding to an experimenter's instructions in a one-time situation. Their performance on that particular day might have been affected by fleeting or transitory factors.

While creativity is often thought of as an innate ability that is stable and consistent from day to day and situation to situation, research has shown that creative performance is sensitive to mood as well as various aspects of the environment (see Byron, Khazanchi, & Nazarian, 2010 for a meta-analysis). For example, positive affect has been found to be related to higher creative performance in a work environment (Amabile, Barsade, Mueller, & Staw, 2005). Furthermore, several studies have shown that it is relatively easy to manipulate performance on creativity measures. For example, participants who were simply told that they were being watched by a researcher in another room generated products that were rated as less creative than participants in a comparison group who were not told they were being watched, suggesting that factors such as the perception of social evaluation can have an effect on creativity (Amabile, Goldfarb, & Brackfield, 1990). This area of research suggests that creativity (at least in some cases) is dependent on psychological *states* and perceptions of the environment, rather than simply a *trait* or ability that resides within an individual, accessible to a consistent degree at any moment. It is possible that the children were particularly sensitive to aspects of the testing environment or their psychological states during the assessment at Time 1 that could have affected their performance on laboratory measures of creativity and therefore been unrelated to performance on similar measures at Time 2.

Paracosms

Time 2 of this study was part of a research project designed to collect information about imaginary worlds that some children create in middle childhood and to explain how this activity is related to other aspects of children's lives. Previous work on this topic has included historical accounts and retrospective reports from adults (Ratchford, 1949). Our previous work in the project includes a case study in which paracosms were found to be elaborate and detailed creations that reflect real-world interests and are oftentimes a social activity shared with real friends (Taylor et al., 2015). We have also conducted two larger studies (77 and 92 children, respectively) using procedures similar to that of Time 2 (Taylor et al., in prep). While the data are still being analyzed, the results thus far indicate that approximately 17% of children have paracosms and these children tend to receive higher ratings on creativity measures that include social content (but not for measures focused on object manipulation), score higher on a measure of social skills, report a greater use of adaptive coping strategies, and score lower on a measure of inhibitory control.

The data from Time 2 demonstrate a comparable frequency of paracosms (6 out of 41 children; 15%). Children with paracosms received high ratings on creativity measures, but comparisons with other children did not provide significant results, probably due to the small sample size. All of the children at Time 2 with paracosms had a history of imaginary companions as well, suggesting that having a paracosm might be developmentally linked to earlier creative behaviors. Taken together, this set of studies suggest that contrary to the stereotype of fantasy-prone children as lonely or socially awkward, children with paracosms appear to be creative and socially adept, use effective

coping strategies, and have a history of engaging in other creative activities outside the laboratory (i.e., imaginary companions).

Limitations

The limitations of this dissertation should be kept in mind when interpreting the results. The sample, while reflective of the local demographics, was relatively homogenous and modest in size. In particular, analyses that included Time 2 data were underpowered to detect smaller effects as a function of the relatively small sample size. Unfortunately, the possible sample size was limited as a function of the original sample at Time 1 and the challenges of contacting families after eight years. The small sample size at Time 2 was particularly problematic for the correlational analyses of individual differences, with most findings becoming statistically non-significant after correcting for multiple comparisons. Thus, the results for measures of executive function, psychosocial functioning, and coping should be considered preliminary at best – pilot work for guiding future research.

There was also some indication that the families who did decide to participate at Time 2 (although not significant) might have had a larger than usual proportion of children who were identified as having imaginary companions. However, children's scores on other measures were generally within the normative range and the percentage of children who had paracosms (15%) was consistent with other studies, suggesting that while there appeared to be more children who reported imaginary companions, the children did not necessarily present as unusually competent or high fantasy in other areas.

Another limitation of this study involved missing data. All the available data were used (i.e., I did not drop participants with missing data), but this strategy limits the

ability to include all variables in a single analysis and opens up the possibility of bias if missing data were due to systematic factors. However, the overall pattern of results with all the available data were replicated when analyses were conducted using only participants who had no missing data. Nevertheless, the issue of missing data was particularly troublesome for the drawing task at Time 1. 25% of the data were missing, mostly due to children declining to participate or not completing the drawing of the second picture. One possible explanation is that some children became fatigued (the drawing task was one of the last tasks in the procedure). Another possibility is that the children who did not complete drawings of a pretend person might not have been able to generate ideas for these drawings. However, this latter explanation seems unlikely because these children did not score significantly lower on the other measures of creativity. In future research with young children, the drawing task should be presented earlier in the procedure, the procedure should be less lengthy, and/or children who do not complete tasks should be queried about the reasons they chose not to finish.

Future Directions

Despite these limitations, this research provides new information about the assessment of children's creativity and how performance on laboratory measures of creativity is related to elaborated role play and other imaginative behaviors concurrently as well as over time. Future work will benefit from exploring and expanding the measures of creativity for preschool age children, as well as surveying other activities familiar to young children that could be coded for creativity using the consensual assessment technique. One of the benefits of this technique is that it can be used for a broad range of activities. Thus it would be possible to include measures of nonsocial

creativity with preschool-age children to examine the social/non-social distinction of creativity with this age group. For example, future research with young children could include consensual assessment of the creativity of building with blocks (Holmes & Geiger, 2002), gross motor activities (Torrance, 2000), as well as making collages (like Time 2; Amabile & Gitomer, 1984).

Given that the creativity ratings of role play characters at Time 1 was the strongest predictor of later performance on creativity measures, it would be worthwhile to more closely examine the features of children's elaborated role play to determine whether there are specific qualities of elaborated role play characters that lead to higher creativity ratings (e.g., idiosyncratic details, the inclusion of fantasy elements, longer descriptions, etc.). Efforts to disentangle the elements that are likely involved in how creative a character might be, such as the type of role play (i.e., invisible friend, personified object, or pretend identity), how frequently a child engages in the role play, and the importance of a specific character to the child, will help to clarify the ways in which elaborated role is related to the development of creativity.

It would also be beneficial in future research to systematically examine children's perceptions of creativity tasks: Are the tasks perceived by children as fun and enjoyable? Do children describe the tasks as easy to understand and complete or as challenging and difficult? For older children, to what degree do they perceive the tasks as evaluative and feel pressure to do well? The answers to these questions are important for determining whether measures should continue to be used in future research as well as inform the psychological states that are related to performance on creativity measures for children.

Future longitudinal studies that include a range of creativity measures that use the consensual assessment technique with multiple data collection waves would provide valuable information about the developmental progression of creativity. Currently, the research in this area is based almost completely on standard divergent thinking procedures which have led to conclusions that the development of creativity involves “slumps” and “peaks” at different periods in development. However, these findings could be caused by task demands of divergent thinking tasks that have more to do with cognitive development and less to do with actual creativity. Longitudinal assessments that include generating products rated for creativity using the consensual assessment technique might help to clarify the developmental course of creativity.

Conclusion

In this dissertation, I found evidence that the elaborated role play activities of early childhood are not simply cute and entertaining – fleeting flights of fancy with no long lasting effects or value. Rather, the creativity of early role play appears to be related to creativity across several years and a wide-range of tasks and domains. It is possible that elaborated role play reflects relatively stable behaviors, personality characteristics, and/or preferences that reflect or possibly shape the capacity to generate creative solutions. These findings provide further support for the claim that, rather than distracting from the real world, imaginative activities are integral to everyday life and are helpful in solving problems and meeting the demands presented therein (Taylor, 2013). Gaining insight into the emerging creativity of young children, how it relates to various aspects of development and individual differences, and the ways in which it can be enhanced may be important keys to advance our understanding of imagination, a

fundamental capacity of the human mind (see Jalongo & Hirsh, 2012; Korn-Bursztyn, 2012).

APPENDIX A

TIME 1: CHILD ROLE PLAY INTERVIEW

Imaginary companions

Now, I am going to ask you some questions about pretending. Some friends are real like the kids who live on your street, the ones you play with. And some friends are pretend friends. Pretend friends are ones that are make-believe, that you pretend are real.

1. Do you have a pretend friend? yes _____ no _____

If “no”: Have you ever had a pretend friend? yes _____ no _____

If “no”, but parent said “yes”: Who is (name given by parent)?

2. What is/was your friend's name?

If many are listed: Which is the one you play with the most?

(At end, ask child for information about the other ICs.)

3. Was/Is your friend a toy like a stuffed animal or a doll, or was/is it completely pretend?

(If child says “completely pretend” confirm by saying: “It’s invisible.” If child says “no”, ask, “Is it toy or doll?”)

Invisible? yes _____ no _____ Toy or doll? yes _____ no _____

4. Is it a person, animal (what kind), or something else (what is it)?

5. Is it a boy _____ girl _____?

6. How old is (name of pretend friend)?

7. What does (name) look like?

8. How did you meet (name)?

9. When you want to play with (name), how do you get him/her to show up?

10. When you and (name) are together, what do you like to do?

11. Can (name) do anything special? **(If child just says yes, ask: Can you tell me about that?)**

12. What do you like most about (name)?

13. What do you not like about (name)?

14a. Do you play with (name) a lot or not very much? A lot _____ not very much _____
(If “a lot”) almost every day _____ less than that _____

(If “not very much”) just one time _____ more than that _____

15. When you play with (name), is it ___ just you and (name) or ___ are there other people there? [If other people, who? ___ friends, ___ brothers/sisters, ___ mom/dad, ___ somebody else (who?) _____]

16. Where does (name) go when s/he is not with you?

17. Can you tell me why (name) is your friend?

18. For previous pretend friends: What happened to (friend)?

19. When did you stop playing with (friend)?

20. Why did you stop playing with (friend)?

21. Would you please draw a picture of (friend)?

22. (If applicable) Can you please tell me about (other ICs)?

Pretend identities

Now I'm going to ask you about another type of pretending. Sometimes children like to pretend that they are someone else. They like to talk and act like another person or an animal.

23. Do you pretend to be someone else – like another person or an animal?

Yes _____ No _____

If “no”: Have you ever pretended to be someone else? Yes _____ No _____

If “no”, but parent said “yes”: What about pretending to be (name given by parent)? _____

24. Who do you pretend to be? (**If many are listed:** Who do you pretend to be the most?)

25. Is (name) a person, an animal (what kind), or something else (what is it)?

26. Is (name) a boy _____ or a girl _____?

27. How old is (name)?

28. When you are (name), what does (name) like to do?

29. Do you like to wear something special when you pretend to be (name)? (**If child just says yes, ask:** Can you tell me about that?)

30. When you are (name), can (name) do anything special? (**If child just says yes, ask:** Can you tell me about that?)

31. What do you like most about being (name)?

32. What do you not like about being (name)?

33. Do you pretend to be (name) a lot or not very much? A lot _____ not very much _____

(If “a lot”) almost every day _____ less than that _____

(If “not very much”) just one time _____ more than that _____

34. When you pretend to be (name), is it just you or are other people there (e.g., mom, friend, etc.)?

35. Can you tell me why you pretend to be (name)?

If child indicates that this happened in the past:

36. When did you stop pretending to be (name)?

37. Why did you stop playing to be (name)?

38. Would you please draw a picture of (name)?

39. (if applicable) You said that sometimes you pretend to be (other name). Tell me about (other name).

APPENDIX B

TIME 1: PARENT ROLE PLAY QUESTIONNAIRE

Imaginary companions

Many children enjoy pretending to interact with someone who is not real. For example, they might talk to an invisible character that they have created or that is based on a real person who is not actually present (e.g., a favorite cousin who lives far away). The pretend interactions might also be with a special stuffed animal or doll. For some children, this type of pretend play is frequent and the child is described as having an imaginary companion.

1. Does your child currently have an imaginary companion? yes _____ no _____

If no, did your child have an imaginary companion in the past? yes _____ no _____

If your child has **never** had an imaginary companion, please skip to Question #16.

If your child has **ever** had an imaginary companion, please continue.

Description of imaginary companion:

2. Is the imaginary companion completely invisible _____ or is it a toy _____?

If the imaginary companion is a **toy**, does your child treat the toy primarily as a comfort object (i.e., she or he carries it around and/or sleeps with it) or does she or he treat it as if it was another person (e.g., talks to it, listens to what it says, describes its life to others, etc.).

Comfort object _____ another person _____ both _____

3. What is the name(s) of the imaginary companion(s)?

If your child has many, which one does he or she play with the most?

4. Is it a person, an animal (what kind?), or something else (please describe)?

5. Is the imaginary companion a male, a female, or are you not sure?

6. Does your child talk about the imaginary companion as being a particular age (e.g., 4 years old) or provide any information about its age (e.g., very old, adult, child, infant...)?

7. If the imaginary companion is **invisible**, what do you know about the physical characteristics of the imaginary companion (e.g., size, hair color, clothing)?

If the imaginary companion is a **toy**, please describe the toy:

8. What do you know about the personality and behavior of the imaginary companion (e.g., does your child describe the imaginary companion as being funny, shy...)?

9. Can the imaginary companion do anything special (e.g., fly)?

Types of activities with imaginary companion:

10a. Some parents directly observe their child talking to or interacting with the imaginary companion. Other parents learn about the imaginary companion indirectly – their child tells them about what the imaginary companion is like and what it is doing.

Do you see your child interacting with the imaginary companion? yes ___ no ___

Does your child tell you about the imaginary companion? yes _____ no _____

Please describe: _____

10b. When your child is playing with the imaginary companion (please check one option):

_____ he or she is almost always alone.

_____ sometimes he or she is alone and sometimes other people are involved in the play. _____ almost always there are other people involved in the play (who? _____ parent _____ siblings _____ friend)

Please

describe: _____

11. Does your child make a special voice for the imaginary companion? yes ___ no _____

Please describe: _____

12. Does your child use the imaginary companion to escape blame (e.g., says the imaginary companion broke the vase) _____, to bargain (e.g., says the imaginary companion gets to stay up late) _____ or does she or he use the imaginary companion in other types of interactions with you? Please describe _____

Duration and frequency of activities with imaginary companion:

13. How old was your child when the imaginary companion first appeared?

Were there any special circumstances that coincided with the appearance of the imaginary companion (e.g., birth of sibling, move to new place)?

14. For past imaginary companions, when did your child stop playing with the imaginary companion?

Were there any special circumstances that coincided with the disappearance?

15. During the period in which your child had an imaginary companion, how often did your child play with or talk about the imaginary companion?

Only once or twice ___ occasionally ___ frequently ___ almost every day ___

Your reactions to the imaginary companion:

16. How do you feel about your child having an imaginary companion (if your child does not have an imaginary companion, how would you feel if he or she did)?

very positive _____ comfortable _____ uncomfortable _____

Why do you feel this way?

Additional comments:

Pretend identities

Many children enjoy pretending to be someone else (a person or animal). For some children this type of play goes beyond occasional pretend games of “house” or “doctor.” For these children, the pretend play can be almost like having an alter ego or pretend identity. They act out a particular role on a regular basis.

17. Does your child have a pretend identity? yes _____ no _____

If no, did your child have a pretend identity in the past? yes _____ no _____

If your child has **never** had a pretend identity, please skip to Questions #29.

If your child has **ever** had a pretend identity, please continue.

Description of pretend identity:

18. Who does your child pretend to be? Name:

If your child pretends to be lots of different people or animals, which one does he or she pretend to be the most?

Does your child ask you to call him or her by that name? yes _____ no _____

19. Is the pretend identity a person, animal (what kind?), or something else (please describe)?

20. Is the pretend identity a male, a female, or are you not sure?

21. Does your child talk about being a particular age (e.g., 4 years old) when she or he is pretending to be the identity or provide any information about its age (e.g., very old, adult, child, infant...)?

22. What do you know about the physical characteristics of the pretend identity?

Does your child use any props or articles of clothing to enhance this role play? (e.g., a mouse's tail) yes _____ no _____ If yes, please describe:

23. How would you describe the personality and behavior of the pretend identity (e.g., does your child pretend to be bold, funny, etc.)?

Does your child talk or act in a special way when she or he is pretending to be the person/animal? Please describe:

24. Does your child claim to be able to do special things (e.g. fly) or have special powers when she or he acts out the pretend identity?

25. Does your child use the pretend identity to bargain (e.g., says "Batman" gets to stay up late) _____, or does she or he use the pretend identity in other types of interactions with you? Please describe.

26. When your child is the pretend identity (please check one option):

_____ he or she is almost always alone.

_____ sometimes he or she is alone and sometimes other people are involved in the play (who? _____ parent _____ siblings _____ friend).

_____ almost always there are other people involved in the play (who? _____ parent _____ siblings _____ friend).

Please describe:

Duration and frequency of pretend identity:

27. At what age did your child first start pretending to be someone else?

Were there any special circumstances that coincided with the appearance of the pretend identity (e.g., birth of sibling, move to new place)?

28. For past pretend identities, at what age did your child stop pretending to be someone else?

Were there any special circumstances that coincided with the end of this pretense?

29. During the period in which your child had a pretend identity, how often did/does your child pretend to be someone else?

Only once or twice ___ occasionally ___ frequently ___ almost every day _____

Your reactions to the pretend identity:

30. How do you feel about your child having a pretend identity (if your child does not have a pretend identity, how would you feel if she or he did)?

very positive _____ comfortable _____ uncomfortable _____

Why do you feel this way?

APPENDIX C

TIME 2: CHILD IMAGINARY COMPANION INTERVIEW

For the next part, I'm going to ask you some questions about activities that some kids like to do.

Imaginary Companions

First, I'm going to ask you about imaginary friends. An imaginary friend is someone who is make-believe; an imaginary person or animal that you play with, talk to, or think about a lot. Sometimes an imaginary friend is completely invisible and sometimes it is a toy, like a very special stuffed animal or doll.

Do you have an imaginary friend? YES NO

[If no] What about when you were younger, when you were a little kid, have you ever had an imaginary friend? YES NO

What is/was your friend's name?

Is/was your friend invisible or is it a toy like a stuffed animal or a doll?

How is this stuffed animal or doll different from other stuffed animals or dolls?

Is it a person, animal (what kind), or something else (what is it)?

Is it a boy or girl?

How old is (name of pretend friend)?

What does (name) look like? (Hair color? Size?)

What is (name) like? (What kind of friend is he/she?)

When you and (name) are together, what do you like to do? (Do you play games or talk about things? Do you like to make up stories about name?)

Does (name) have his/her own friends, relatives and parents?

Do you play with (name) in a pretend world? Are there imaginary houses, woods, or anything like that?

Does (name) ever help you feel better about something? Can you tell me about that?

Does (name) ever need you to help him/her feel better? Can you tell me about that?

What do you like most about (name)?

Is there anything that you don't like about (name)?

Do you play with or think about (name) a lot or not very much? ("not very much": Just one time or more than that?; "A lot": Everyday or less than that?)

How old were you when (name) first appeared?

For previous pretend friends: How old were you when you stopped thinking about or playing with (name)? Why do you think you stopped thinking about and playing with (name)?

Is there anything else about (name) that you think is interesting or that was important to you?

[If applicable] When you were a little kid, you told us that you had an imaginary friend named _____. Do you remember that friend? YES NO

[if yes] What do you remember about him/her?

What happened to him/her? (How old were you when you stopped playing with him/her?)

APPENDIX D

TIME 2: CHILD PARACOSM INTERVIEW

Some kids your age tell us they have a special imaginary place that they think about a lot.

Is that something you like to do? YES NO

[If no] What about when you were younger, when you were a little kid, did you ever used to think about an imaginary place? YES NO

[If yes to either of the above] Can you tell me about it?

[After obtaining a brief description, determine the best interview to proceed with]

_____ Imaginary place created by the child (e.g., Abixia)

_____ Fictional place created by others (e.g., Hogwarts)

_____ Daydreaming about real places (e.g., Disneyland)

[If in doubt, ask clarifying questions "Is that a real place?" "Is that a place from a book or movie?" etc. If still unsure, do the full paracosm interview as it's the most thorough]

Imaginary Place Created by Child Interview

Does your imaginary place have a **name**?

What sort of place is it? Can you tell me what it looks like? (for IDK: Is it more like the city or more like the country? Tell me more about that?)

Does any one live there? (if yes, tell me about them)

For the next part, I want you to look at this list [present paracosm categories list] and circle the things that are most important about (name of place). (Allow the child to read the list, answer his/her questions as necessary, and read the categories if necessary).

Now, I'm going to ask you some more questions about the things you circled. (Ask additional questions for each category circled by the child). (Feel free to ask for elaboration on anything that seems noteworthy or particularly interesting. "Can you tell me more about that" is a good general prompt, other questions about specific features or clarifications is fine as well.)

People: You already told me (xxx) about the people there, are there other things about the people that are important? (What do people do there? Can you tell me about their lives? Do they work? What do they like to do for fun? Are they more happy or more sad?)

Animals: What can you tell me about the animals in (name of place)? (Are there different kinds of animals? What are they called? What do they look like? What do they do in (name of place)?)

Maps and landscapes: What is the landscape or geography like? (Have you ever made any drawings or maps of it? [if yes and time permits, ask the child to draw a map])

How people get around: How do people get around there? (Do they walk? Drive cars? Take the train? Is it difficult or easy to get around?) Do the people like to travel? (where do they travel to?)

Architecture (buildings, houses, etc.): What are the buildings and other structures like in (name of place)?

Books and newspapers: Do they like to read a lot there? Do they have there own books, newspapers, or other reading materials? (What are they about?)

Movies, video games, and other forms of entertainment: Do they like to watch movies, play video games, or other things like that? (surf the web? Go to the movie theater?). Do they have their own movies or video games there?

Games and sports: What kinds of games or sports do they like to do there? Do they have their own games or sports there?

Music and dancing: What's the music like there? (Is it like the music here or is it different? Are there musical instruments? Concerts?) Is there dancing? (Is it like dancing here or is it different? What's it like? Are there special dances?)

Art and sculpture: What is art like there? (Is it like art here or is it different? Are there different types of art? Where is art displayed? Galleries?)

Clothes and fashion: How do people dress there? (Are there certain kinds of clothes or styles that are in fashion or popular? What do the clothes look like?)

Food and cooking: What do they like to eat there? (Do they have special kinds of food? What does it taste like?) Do you like to imagine cooking dishes? (what kinds of dishes?)

Medicine and healing: Do people get sick there? (what happens if people get sick? Is there medicine? Are there doctors or hospitals that take care of them? Do people ever die there?)

Everyday activities (such as work and habits): What are the everyday activities that you think about a lot?

Family and friends: What is it about family and friends that is important in (name of place)? What are relationships like there?

Traditions: What are the traditions in (name of place)?

History: Tell me about the history of (name of place). (How far back does it go? What are the important events that have happened? Do they study/record the history?) How old is (name of place)? (Has it changed over time? How has it changed?)

Religion: Are there any particular religions there? (What do they believe? Are there special rituals?)

Holidays and celebrations: Are there any special holidays or celebrations that happen there? (What do they do during these holidays/celebrations?)

Rulers: Is there someone in charge of everything? (kings and queens? A president? A group of people?) What is (ruler) like?

Important characters: Are there specific characters that you think about when you think about (name of place)? Who are they? What are they like?

Special abilities or powers: Who has special abilities? What are the special abilities?

Government, laws, and legal system: Is there a government there? (What is the government like?) Are there laws or a legal system there? (What kinds of laws? What happens if someone commits a crime? Are they punished? How so?)

Military and war: Is there a military there? (What do they do?) Are there wars? (Tell me about the wars?)

Flags: Do they have special flags? (what do they look like?)

Money: Do they use money to buy things there? (What does it look like?)

Languages: Is there a special language there? (Does it have its own written language? Is there a special way to speak it?)

Sight: Why is "sight" an important part of (name of place)? (Do you like to imagine the way things look?)

Sound: Why is “sound” an important part of (name of place)? (Do you like to imagine the way things look?)

Smell: Why is “smell” an important part of (name of place)? (Do you like to imagine the way things look?)

Taste: Why is “taste” an important part of (name of place)? (Do you like to imagine the way things look?)

Touch: Why is “touch” an important part of (name of place)? (Do you like to imagine the way things look?)

The way that it makes you feel: How does it make you feel to imagine (name of place)?

That it’s different from the real world: What is it that you like best about how it’s different from the real world?

Creating things: What sorts of things do you create? (maps, drawings, flags, money, write stories, etc.)

That it is fun:

Other:

[ASK ALL OF THE FOLLOWING QUESTIONS]

When did you **first start thinking about** (name of paracosm)? (How old were you?)

How often do you think about (name of paracosm) now? (would you say a lot or not very often? Every day? One or two times a week?) (if not at all: when did you stop thinking about it? Why do you think you stopped thinking about it?)

Do you think about (name of paracosm) when you’re alone or when you’re with other people?

If alone: Have you ever told anyone about it? (if yes) Who? (if no) Does anyone else know about it or is it a secret?

If others: who are you usually with? (Who created the place first? What do each of you do there? How did you start to share it?)

Have you created things related to (name of place)? (have you ever written stories or histories about it? Are there other things that you’ve created, like maps, money, newspapers, magazines, flags, clothes, songs, drawings, rituals?)

Are there things that you’re interested in in the real world that are related to (name of place)? (How is that like or different from doing those things in the real world?)

What is your favorite thing about (name of place)?

Is there anything you don’t like about (name of place)?

Is there anything else that I should know about (name of place)? Anything else that is important that we haven’t talked about already?

Fictional place created by others interview (e.g., Hogwarts, Narnia, etc.)

Name of the place:

What do you think about when you imagine (name of place)? What it looks like? The stories and characters from the book/movie? Activities that you might do? The people there? Food? Clothes? Other things?

Do you ever create new things for (place) that aren’t in the book/movie? Or do you think of it just as it is in real life?

When did you **first start thinking about** (name of paracosm)? (How old were you?)

How often do you think about (name of paracosm) now? (would you say a lot or not very often? Every day? One or two times a week?) (if not at all: when did you stop thinking about it? Why do you think you stopped thinking about it?)

Do you think about (name) when you're alone or do you imagine it with other people?

If alone: Have you ever told anyone about it?

If others: who are you usually with? What sort of things do you do together when you imagine (place)?

What is your favorite thing about imagining (name)?

Have you ever made things, like drawings or maps or written stories or anything like that? Do you collect things related to (place)?

Real place interview (e.g., Remembering trip to Venice, daydreaming about Disneyland)

Name of the place:

What do you think about when you imagine (name of place)? What it looks like?

Foods? Activities that you might do? The people there? Other things?

Do you ever imagine anything that isn't actually there? (do you add details?) Or do you think of it just as it is in real life?

When did you **first start thinking about** (name of place)? (How old were you?)

How often do you think about (name of place) now? (would you say a lot or not very often? Every day? One or two times a week?) (if not at all: when did you stop thinking about it? Why do you think you stopped thinking about it?)

Do you think about (name) when you're alone or do you imagine it with other people?

If alone: Have you ever told anyone about it?

If others: who are you usually with? What sort of things do you do together when you imagine (place)?

What is your favorite thing about imagining (name)?

Have you ever made things, like drawings or maps or written stories or anything like that? Do you collect things related to (place)?

APPENDIX E

TIME 2: CHILDREN'S COPING STRATEGIES CHECKLIST

Instructions

Sometimes kids have problems or feel upset about things. When this happens, they may do different things to solve the problem or to make themselves feel better. For each item below, choose the answer that BEST describes how often you usually did this to solve your problems or make yourself feel better during the past month. There are no right or wrong answers, just indicate how often YOU USUALLY did each thing in order to solve your problems or make yourself feel better during the past month.

Never	Sometimes	Often	Most of the time
1	2	3	4

- _____ 1. *When you had problems in the past month*, you thought about what you could do before you did something.
- _____ 2. You tried to notice or think about only the good things in your life.
- _____ 3. You tried to ignore it.
- _____ 4. You told people how you felt about the problem.
- _____ 5. You tried to stay away from the problem.
- _____ 6. You did something to make things better.
- _____ 7. You talked to someone who could help you figure out what to do.
- _____ 8. You told yourself that things would get better.
- _____ 9. You listened to music.
- _____ 10. You reminded yourself that you are better off than a lot of other kids.
- _____ 11. *When you had problems in the past month*, you daydreamed that everything was okay.
- _____ 12. You went bicycle riding.
- _____ 13. You talked about your feelings to someone who really understood.
- _____ 14. You told other people what you wanted them to do.
- _____ 15. You tried to put it out of your mind.
- _____ 16. You thought about what would happen before you decided what to do.
- _____ 17. You told yourself that it would be OK.
- _____ 18. You told other people what made you feel the way you did.
- _____ 19. *When you had problems in the past month*, you told yourself that you could handle this problem.
- _____ 20. You went for a walk.
- _____ 21. You tried to stay away from things that made you feel upset.
- _____ 22. You told others how you would like to solve the problem.
- _____ 23. *When you had problems in the last month*, you tried to make things better by changing what you did.
- _____ 24. You told yourself you have taken care of things like this before.
- _____ 25. You played sports.
- _____ 26. You thought about why it happened.
- _____ 27. You didn't think about it.

- _____ 28. You let other people know how you felt.
- _____ 29. You told yourself you could handle what ever happens.
- _____ 30. You told other people what you would like to happen.
- _____ 31. You told yourself that in the long run, things would work out for the best.
- _____ 32. You read a book or magazine.
- _____ 33. *When you had problems during the past month*, you imagined how you'd like things to be.
- _____ 34. You reminded yourself that you knew what to do.
- _____ 35. You thought about which things are best to do to handle the problem.
- _____ 36. You just forgot about it.
- _____ 37. You told yourself that it would work itself out.
- _____ 38. *When you had problems in the past month*, you talked to someone who could help you solve the problem.
- _____ 39. You went skateboard riding or roller skating.
- _____ 40. You avoided the people who made you feel bad.
- _____ 41. You reminded yourself that overall things are pretty good for you.
- _____ 42. You did something like video games or a hobby.
- _____ 43. You did something to solve the problem.
- _____ 44. *When you had problems in the last month*, you tried to understand it better by thinking more about it.
- _____ 45. You reminded yourself about all the things you have going for you.
- _____ 46. You wished that bad things wouldn't happen.
- _____ 47. You thought about what you needed to know so you could solve the problem.
- _____ 48. *When you had problems in the last month*, you avoided it by going to your room.
- _____ 49. You did something in order to get the most you could out of the situation.
- _____ 50. You thought about what you could learn from the problem.
- _____ 51. You wished that things were better.
- _____ 52. You watched TV.
- _____ 53. You did some exercise.
- _____ 54. You tried to figure out why things like this happen.

APPENDIX F

TIME 2: PARENT IMAGINARY COMPANION AND PARACOSM QUESTIONNAIRE

Imaginary companions

Many children enjoy pretending to interact with someone who is not real. For example, they might talk to an invisible character that they have created or that is based on a real person who is not actually present (e.g., a favorite cousin who lives far away). The pretend interactions might also be with a special stuffed animal or doll. For some children, this type of pretend play is frequent and the child is described as having an imaginary companion.

1. Does your child currently have an imaginary companion? yes _____ no _____
If no, did your child have an imaginary companion in the past? yes _____ no _____

If your child has **never** had an imaginary companion, please skip to Question #16.

If your child has **ever** had an imaginary companion, please continue.

Description of imaginary companion:

2. Is the imaginary companion completely invisible _____ or is it a toy _____?

If the imaginary companion is a **toy**, does your child treat the toy primarily as a comfort object (i.e., she or he carries it around and/or sleeps with it) or does she or he treat it as if it was another person (e.g., talks to it, listens to what it says, describes its life to others, etc.).

Comfort object _____ another person _____ both _____

3. What is the name(s) of the imaginary companion(s)?

If your child has many, which one does he or she play with the most?

4. Is it a person, an animal (what kind?), or something else (please describe)?

5. Is the imaginary companion a male, a female, or are you not sure?

6. Does your child talk about the imaginary companion as being a particular age (e.g., 4 years old) or provide any information about its age (e.g., very old, adult, child, infant...)?

7. If the imaginary companion is **invisible**, what do you know about the physical characteristics of the imaginary companion (e.g., size, hair color, clothing)?

If the imaginary companion is a **toy**, please describe the toy:

8. What do you know about the personality and behavior of the imaginary companion (e.g., does your child describe the imaginary companion as being funny, shy...)?

9. Can the imaginary companion do anything special (e.g., fly)?

Types of activities with imaginary companion:

10a. Some parents directly observe their child talking to or interacting with the imaginary companion. Other parents learn about the imaginary companion indirectly – their child tells them about what the imaginary companion is like and what it is doing.

Do you see your child interacting with the imaginary companion? yes _____ no _____

Does your child tell you about the imaginary companion? yes _____ no _____

Please describe:

- 10b. When your child is playing with the imaginary companion (please check one option):

_____ he or she is almost always alone.

_____ sometimes he or she is alone and sometimes other people are involved in the play.

(who? _____ parent _____ siblings _____ friend)

_____ almost always there are other people involved in the play

(who? _____ parent _____ siblings _____ friend)

Please describe:

11. Does your child make a special voice for the imaginary companion? yes ___ no ___

Please describe:

12. Does your child use the imaginary companion to escape blame (e.g., says the imaginary companion broke the vase) _____, to bargain (e.g., says the imaginary companion gets to stay up late) _____ or does she or he use the imaginary companion in other types of interactions with you?

Please describe:

Duration and frequency of activities with imaginary companion:

13. How old was your child when the imaginary companion first appeared?

Were there any special circumstances that coincided with the appearance of the imaginary companion (e.g., birth of sibling, move to new place)?

14. For past imaginary companions, when did your child stop playing with the imaginary companion?

Were there any special circumstances that coincided with the disappearance?

15. During the period in which your child had an imaginary companion, how often did your child play with or talk about the imaginary companion?

Only once or twice _____ occasionally _____ frequently _____ almost every day _____

Your reactions to the imaginary companion:

16. How do you feel about your child having an imaginary companion (if your child does not have an imaginary companion, how would you feel if he or she did)?

very positive _____ comfortable _____ uncomfortable _____

Why do you feel this way?

Additional comments:

Imaginary worlds

Many children enjoy creating imagined worlds or places in their minds. For example, they might create an island or other type of land where they pretend to go, or that they use as a setting for creating stories about characters. For some children, this type of play can be a frequent activity, including the creation of drawings and other records of the imagined world.

1. Does your child currently have an imaginary world? yes _____ no _____

If no, did your child have an imaginary world in the past? yes _____ no _____

If your child has **never** had an imaginary world, please skip to Question #22.

If your child has **ever** had an imaginary world, please continue.

Description of imaginary world:

2. Does the imaginary world have a name?

If your child has multiple imaginary worlds, which one does he or she play with or think about the most?

3. Do any characters or people live there?

4. Does the imaginary world have a specific location or geography?
5. Please describe the imaginary world:
6. Some parents directly observe their child interacting with the imaginary world. Other parents learn about the imaginary world indirectly – their child tells them about the imaginary world and what happens there.
7. Do you see your child interacting with the imaginary world? yes ___ no ___
8. Does your child tell you about the imaginary world? yes _____ no _____

Please describe:

9. How did you originally find out about the imaginary world?
10. When your child is playing with the imaginary world (please check one option):
- _____ he or she is almost always alone.
- _____ sometimes he or she is alone and sometimes other people are involved in the play.
- (who? _____ parent _____ siblings _____ friend).
- _____ almost always there are other people involved in the play.
- (who? _____ parent _____ siblings _____ friend).

Please describe:

11. Has your child ever made any drawings or maps of the imaginary world? yes ___ no ___

Please describe:

12. Has your child ever written any stories about the imaginary world? yes ___ no _____

Please describe:

13. Are there other things that your child has created related to the imaginary world?

Duration and frequency of activities with imaginary worlds:

14. How old was your child when the imaginary world first appeared?

15. Were there any special circumstances that coincided with the appearance of the imaginary world (e.g., birth of sibling, move to new place)?

16. For past imaginary worlds, when did your child stop playing with the imaginary world?

Were there any special circumstances that coincided with the disappearance?

17. During the period in which your child had an imaginary world, how often did your child play with or talk about the imaginary world?

Only once or twice _____ occasionally _____ frequently _____ almost every day _____

18. During the period in which your child had an imaginary world, did your child make any changes to the world, or to the way in which he or she interacted with it, that coincided with special circumstances (e.g., birth of sibling, move to new place, start of school, making new friends)?

Your and your child's reactions to the imaginary world:

19. What emotions do you notice your child having while playing with the imaginary world (for example, do they seem happy? Do they ever get upset?)

20. Have you ever participated in your child's imaginary world? (for example, made suggestions for the imaginary world) yes _____ no _____

Please describe:

21. How "real" is the imaginary world for you and your family?

- 22.** How do you feel about your child having an imaginary world (if your child does not have an imaginary world, how would you feel if he or she did)?

very positive _____ comfortable _____ uncomfortable _____
Why do you feel this way?
23. Question about your childhood: When you were a child did you have an imaginary world? Please describe:
Additional comments:

APPENDIX G

TIME 2: STRENGTHS AND DIFFICULTIES QUESTIONNAIRE

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain. Please give your answers on the basis of this young person's behavior over the last six months or this school year.

	Not True	Somewhat True	Certainly True
Considerate of other people's feelings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restless, overactive, cannot stay still for long	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often complains of headaches, stomach-aches or sickness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shares readily with other youth, for example books, games, food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often loses temper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Would rather be alone than with other youth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Generally well behaved, usually does what adults request	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Many worries or often seems worried	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helpful if someone is hurt, upset or feeling ill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Constantly fidgeting or squirming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has at least one good friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often fights with other youth or bullies them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often unhappy, depressed or tearful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Generally liked by other youth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easily distracted, concentration wanders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nervous in new situations, easily loses confidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kind to younger children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often lies or cheats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Picked on or bullied by other youth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often offers to help others (parents, teachers, children)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thinks things out before acting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Steals from home, school or elsewhere	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gets along better with adults than with other youth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Many fears, easily scared	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Good attention span, sees work through to the end	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX H

TIME 2: AUTISM SPECTRUM QUOTIENT: CHILDREN'S VERSION

For each item below, please circle how much you agree or disagree that the statement describes your child.

"Definitely Agree," "Slightly Agree," "Slightly Disagree," and "Definitely Disagree."

1. S/he prefers to do things with others rather than on her/his own.
2. S/he prefers to do things the same way over and over again.
3. If s/he tries to imagine something, s/he finds it very easy to create a picture in her/his mind.
4. S/he frequently gets so strongly absorbed in one thing that s/he loses sight of other things.
5. S/he often notices small sounds when others do not.
6. S/he usually notices house numbers or similar strings of information.
7. S/he has difficulty understanding rules for polite behavior.
8. When s/he is reading a story, s/he can easily imagine what the characters might look like.
9. S/he is fascinated by dates.
10. In a social group, s/he can easily keep track of several different people's conversations.
11. S/he finds social situations easy.
12. S/he tends to notice details that others do not.
13. S/he would rather go to a library than a birthday party.
14. S/he finds making up stories easy.
15. S/he is drawn more strongly to people than to things.
16. S/he tends to have very strong interests, which s/ he gets upset about if s/he cannot pursue.
17. S/he enjoys social chit-chat.
18. When s/he talks, it is not always easy for others to get a word in edgeways.
19. S/he is fascinated by numbers.
20. When s/he is reading a story, s/he finds it difficult to work out the characters' intentions or feelings.
21. S/he does not particularly enjoy fictional stories.
22. S/he finds it hard to make new friends.
23. S/he notices patterns in things all the time.
24. S/he would rather go to the cinema than a museum.
25. It does not upset him/her if his/her daily routine is disturbed.
26. S/he does not know how to keep a conversation going with her/his peers.
27. S/he finds it easy to "read between the lines" when someone is talking to her/him.
28. S/he usually concentrates more on the whole picture, rather than the small details.
29. S/he is not very good at remembering phone numbers.
30. S/he does not usually notice small changes in a situation, or a person's appearance.
31. S/he knows how to tell if someone listening to him/her is getting bored.
32. S/he finds it easy to go back and forth between different activities.
33. When s/he talks on the phone, s/he is not sure when it is her/his turn to speak.

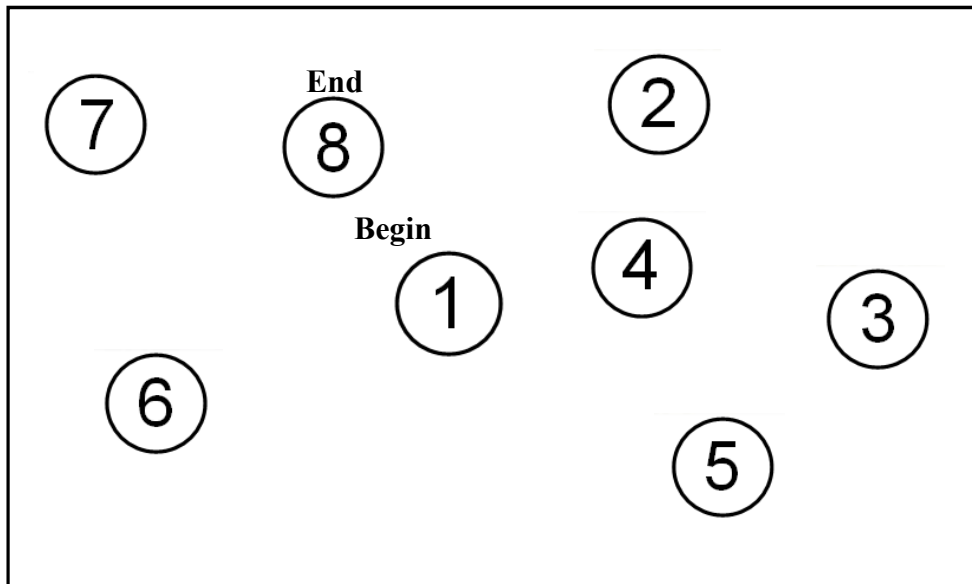
34. S/he enjoys doing things spontaneously.
35. S/he is often the last to understand the point of a joke.
36. S/he finds it easy to work out what someone is thinking or feeling just by looking at their face.
37. If there is an interruption, s/he can switch back to what s/he was doing very quickly.
38. S/he is good at social chit-chat.
39. People often tell her/him that s/he keeps going on and on about the same thing.
40. When s/he was in preschool, s/he used to enjoy playing games involving pretending with other children.
41. S/he likes to collect information about categories of things (e.g., types of car, types of bird, types of train, types of plant, etc.).
42. S/he finds it difficult to imagine what it would be like to be someone else.
43. S/he likes to plan any activities s/he participates in carefully.
44. S/he enjoys social occasions.
45. S/he finds it difficult to work out people's intentions.
46. New situations make him/her anxious.
47. S/he enjoys meeting new people.
48. S/he is good at taking care not to hurt other people's feelings.
49. S/he is not very good at remembering people's date of birth.
50. S/he finds it very easy to play games with children that involve pretending.

APPENDIX J

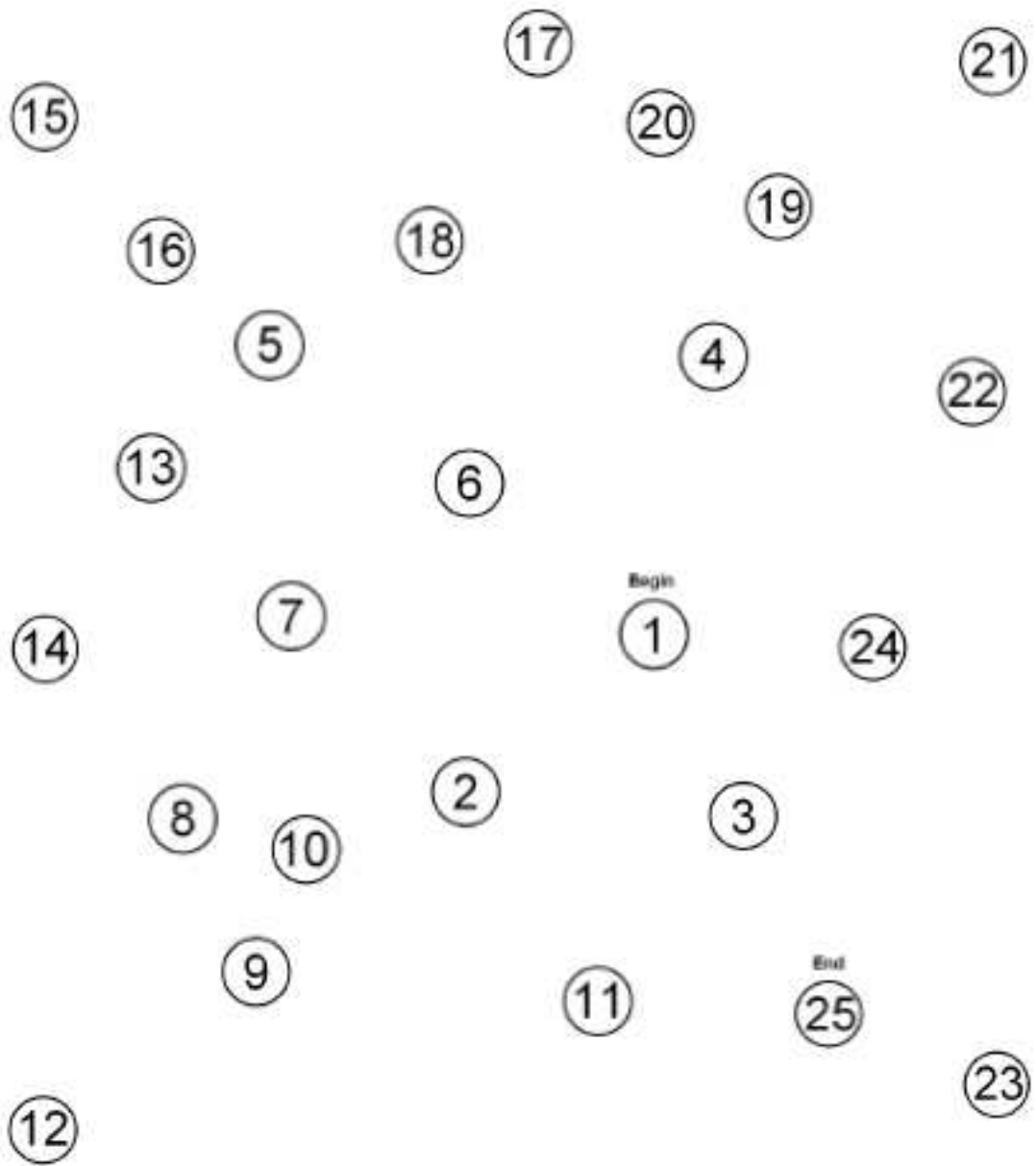
TIME 2: TRAIL MAKING TEST

TRAILMAKING - PART A

SAMPLE

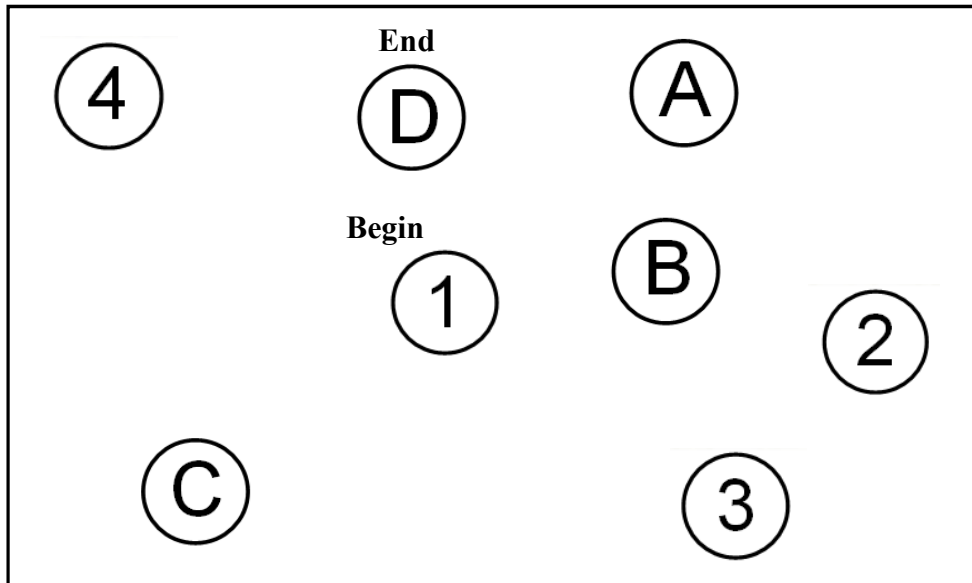


TRAILMAKING - PART A



TRAILMAKING - PART B

SAMPLE



REFERENCES CITED

- Ahn, J., & Filipenko, M. (2007). Narrative, imaginary play, art, and self: Intersecting worlds. *Early Childhood Education Journal*, *34*, 279-289. doi:10.1007/s10643-006-0137-4
- Alexander, P. A., Jetton, T. L., White, S. H., Parsons, J. L., Cotropia, K. K., Liu, H.-C., & Ackerman, C. M. (1994). Young children's creative solutions to realistic and fanciful story problems. *Journal of Creative Behavior*, *28*, 89-106.
- Amabile, T. M. (1982). Social psychology of creativity: a consensual assessment technique. *Journal of Personality and Social Psychology*, *43*, 997-1013. doi:10.1037/0022-3514.43.5.997
- Amabile, T. M. (1996). Creativity in context: Update to "The Social Psychology of Creativity." Boulder, CO: Westview Press.
- Amabile, T. M., & Gitomer, J. (1984). Children's artistic creativity: Effects of choice in task materials. *Personality and Social Psychology Bulletin*, *10*, 209-215. doi: 10.1177/0146167284102006
- Andreason, N.C. (1987). Creativity and mental illness: prevalence rates in writers and their first-degree relatives. *American Journal of Psychiatry*, *144*, 1288-1292.
- Austin, L. M. (2003). Children of childhood: Nostalgia and the romantic legacy. *Studies in Romanticism*, *42*, 75-98. doi: 10.2307/25601604
- Auyeung, B., Baron-Cohen, S., Wheelwright, S., & Allison, C. (2007). The Autism Spectrum Quotient: Children's Version (AQ-Child). *Journal of Autism and Development Disorders*. doi: 10.1007/s10803-007-0504-z
- Ayers, T. S., Sandler, I. N., West, S. G., & Roosa, M. W. (1996). A dispositional and situational assessment of children's coping: testing alternative models of coping. *Journal of Personality*, *64*, 923-58.
- Baer, J. (1991). Generality of creativity across performance domains. *Creativity Research Journal*, *4*, 23-39. doi:10.1080/10400419109534371
- Baer, J. (1998). The case for domain specificity of creativity. *Creativity Research Journal*, *11*, 173-177. doi:10.1207/s15326934crj1102_7
- Barnett, L. A. (1990). Playfulness: Definition, design, and measurement. *Play & Culture*, *3*, 319-336.
- Barron, F., & Harrington, D. M. (1981). Creativity, intelligence, and personality. *Annual Review of Psychology*, *32*, 439-476.

- Beck, S. R., Robinson, E. J., Carroll, D. J., & Apperly, I. A. (2006). Children's thinking about counterfactuals and future hypotheticals as possibilities. *Child Development, 77*, 413-426. doi:10.1111/j.1467-8624.2006.00879.x
- Benedek, M., Franz, F., Heene, M., & Neubauer, A. C. (2012). Differential effects of cognitive inhibition and intelligence on creativity. *Personality and Individual Differences, 53*, 480-485.
- Busse, T. V., Blum, P., & Gutride, M. (1972). Testing conditions and the measurement of creative abilities in lower-class preschool children. *Multivariate Behavioral Research, 7*, 287-298. doi:10.1207/s15327906mbr0703_2
- Carlson, S. M. & Moses, L. J. (2001). Individual differences in inhibitory control and children's theory of mind. *Child Development, 72*, 1032-1053.
- Carson, S. (2010). *Your creative brain: Seven steps to maximize imagination, productivity, and innovation in your life*. San Francisco: Jossey-Bass.
- Carson, S. H., Peterson, J. B., & Higgins, D. M. (2003). Decreased latent inhibition is associated with increased creative achievement in high-functioning individuals. *Journal of Personality and Social Psychology, 85*, 499-506.
- Charles, R. E., & Runco, M. A. (2001). Developmental trends in the evaluative and divergent thinking of children. *Creativity Research Journal, 13*, 417-437.
- Chen, C., Himsel, A., Kasof, J., Greenberger, E., & Dmitrieva, J. (2006). Boundless creativity: Evidence for the domain generality of individual differences in creativity. *The Journal of Creative Behavior, 40*, 179-199.
- Claxton, A. F., Pannels, T. C., & Rhoads, P. A. (2005). Developmental trends in the creativity of school-age children. *Creativity Research Journal, 17*, 327-335.
- Cohen, D., & MacKeith, S. A. (1991). *The development of imagination: The private worlds of childhood*. Taylor & Frances/Routledge.
- Conti, R., Coon, H., & Amabile, T. M. (1996). Evidence to support the componential model of creativity: Secondary analyses of three studies. *Creativity Research Journal, 9*, 385-389. doi:10.1207/s15326934crj0904_9
- Cremin, T., Chappell, K., & Craft, A. (2013). Reciprocity between narrative, questioning and imagination in the early and primary years: Examining the role of narrative in possibility thinking. *Thinking Skills and Creativity, 9*, 135-151. doi: 10.1016/j.tsc.2012.11.003

- Csikszentmihalyi, M. (1996). *Creativity: Flow and the Psychology of Discovery and Invention*. New York: Harper Collins.
- Dansky, J. L. (1980). Make-believe: A mediator of the relationship between play and associative fluency. *Child Development, 51*, 576-579.
- Dansky, J. L., & Silverman, I. W. (1973). Effects of play on associative fluency in preschool-age children. *Developmental Psychology, 9*, 38-43. doi: 10.1037/h0035076
- de Boo, G. M., & Wicherts, J. M. (2009). Assessing cognitive and behavioral coping strategies in children. *Cognitive Therapy Research, 33*, 1-20.
- Dick, A. S., Overton, W. F., & Kovacs, S. L. (2005). The development of symbolic coordination: Representation of imagined objects, executive function, and theory of mind. *Journal of Cognition and Development, 6*, 133-161. doi:10.1207/s15327647jcd0601_8
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology, 92*, 1087-1101.
- Dunn, L.M., & Dunn, D.M. (2007). *The Peabody Picture Vocabulary Test, Fourth Edition*. Bloomington, MN: NCS Pearson, Inc.
- Dziedziewicz, D., Oledzka, D., & Karwowski, M. (2013). Developing 4 to 6 year old children's figural creativity using a doodle-book program. *Thinking Skills and Creativity, 9*, 85-95. doi: 10.1016/j.tsc.2012.09.004
- Emde, R. N., Wolf, D., & Oppenheim, D. (2003). *Revealing the inner worlds of young children: The MacArthur Story Stem Battery and parent-child narratives*. New York: Oxford University Press.
- Eysenck, H. (1995). *Genius: The natural history of creativity*. Cambridge: Cambridge University Press.
- Fein, G. G. (1987). Pretend play: Creativity and consciousness. In D. Görlitz & J. F. Wohlwill (Eds.), *Curiosity, imagination, and play: On the development of spontaneous cognitive motivational processes*. (pp. 281-304). Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.
- Gardner, H. (1982). *Art, mind, and brain: A cognitive approach to creativity*. New York: Basic Books.

- Gelman, S. A., & Gottfried, G. M. (2006). Creativity in young children's thought. In J. C. Kaufman & J. Baer (Eds.), *Creativity and reason in cognitive development* (pp. 221-243). New York, NY: Cambridge University Press.
- Gleason, T. R. (2004). Imaginary companions and peer acceptance. *International Journal of Behavioral Development, 28*, 204-209. doi:10.1080/01650250344000415
- Gleason, T. R., Sebanc, A. M., & Hartup, W. W. (2000). Imaginary companions of preschool children. *Developmental Psychology, 36*, 419-428. doi:10.1037/0012-1649.36.4.419
- Goldstein, T. R., & Winner, E. (2009) Living in alternative and inner worlds: Early signs of acting talent. *Creativity Research Journal, 21*, 117-124. doi: 10.1080/10400410802633749
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry, 38*, 581-586. doi: 10.1111/j.1469-7610.1997.tb01545.x
- Guajardo, N. R., & Turley-Ames, K. J. (2004). Preschoolers' generation of different types of counterfactual statements and theory of mind understanding. *Cognitive Development, 19*, 53-80. doi:10.1016/j.cogdev.2003.09.002
- Guildford, J. P. (1967). *The nature of human intelligence*. New York: McGraw-Hill.
- Han, K.-S. (2003). Domain-specificity of creativity in young children: How quantitative and qualitative data support it. *The Journal of Creative Behavior, 37*, 117-142.
- Han, K.-S., & Marvin, C. (2002). Multiple creativeness? Investigating domain-specificity of creativity in young children. *Gifted Child Quarterly, 46*, 98-109. doi:10.1177/001698620204600203
- Harris, P. (2000). *The work of the imagination*. Oxford: Blackwell Publishers.
- Hennessey, B. A., & Amabile, T. M. (1988). Story-telling: A method for assessing children's creativity. *The Journal of Creative Behavior, 22*, 235-246.
- Hill, O. W., & Clark, J. L. (1998). Childhood fantasy, creativity, and an internal epistemic style. *Journal of Social Behavior & Personality, 13*, 177-183.
- Hoff, E. (2005). Imaginary companions, creativity, and self-image in middle childhood. *Creativity Research Journal, 17*, 167-180. doi:10.1207/s15326934crj1702&3_4
- Holmes, R. M., & Geiger, C. J. (2002). The relationship between creativity and cognitive abilities in preschoolers. In J. L. Roopnarine (Ed), *Conceptual, social-cognitive,*

- and contextual issues in the fields of play: Play & culture studies, vol. 4.* (pp. 127-148). Westport, CT: Ablex Publishing.
- Jalongo, M. R., & Hirsh, R. A. (2012). Reconceptualizing creative thought processes in young children: An integrative review of the research. In O. N. Saracho (Ed.), *Contemporary perspectives on research in creativity in early childhood education* (pp. 89-108). Charlotte, NC: Information Age Publishing.
- Karwowski, M., Gralewski, J., Lebuda, I., & Wiśniewska, E. (2007). Creative teaching of creativity teachers: Polish perspective. *Thinking Skills and Creativity, 2*, 57-61. doi: 10.1016/j.tsc.2006.10.004
- Kaufman, J. C., & Beghetto, R. A. (2009). Beyond big and little: The four c model of creativity. *Review of General Psychology, Vol 13*, 1-12. doi: 10.1037/a0013688
- Kaufman, S. B., & Kaufman, J. C. (2007). Ten years to expertise, ten more to greatness: An investigation of modern writers, *Journal of Creative Behavior, 41*, 114-124.
- Karmiloff-Smith, A. (1990). Constraints on representational change: Evidence from children's drawing. *Cognition, 34*, 57-83. doi:10.1016/0010-0277(90)90031-E
- Kaufman, J. C., Cole, J.C., & Baer, J. (2009). The construct of creativity: A structural model for self-reported creativity ratings. *Journal of Creative Behavior, 43*, 119-134. doi: 10.1002/j.2162-6057.2009.tb01310.x
- Kidd, E., Rogers, P., & Rogers, C. (2010). The personality correlates of adults who had imaginary comparisons in childhood. *Psychological Reports, 107*, 163-172. doi: 10.2466/02.04.10.PR0.107.4.163-172
- Kleibeuker, S. W., De Dreu, C. K., & Crone, E. A. (2013). The development of creative cognition across adolescence: Distinct trajectories for insight and divergent thinking. *Developmental Science, 16*, 2-12. doi:10.1111/j.1467-7687.2012.01176.x
- Korn-Bursztyn, C. (2012). *Young children and the arts: Nurturing imagination and creativity*. Charlotte, NC: Information Age Publishing.
- Lau, S., & Cheung, P. C. (2010). Creativity assessment: Comparability of the electronic and paper-and-pencil versions of the Wallach-Kogan Creativity Tests. *Thinking Skills and Creativity, 5*, 101-107. doi:10.1016/j.tsc.2010.09.004
- Li, W. L., Poon, J. C. Y., Tong, T. M. Y. & Lau, S. (2013). Psychological adjustment of creative children: Perspectives from self, peer and teacher. *Educational Psychology, 33*, 616-627. doi: 10.1080/01443410.2013.824069
- Lillard, A. S., Lerner, M. D., Hopkins, E. J., Dore, R. A., Smith, E. D., & Palmquist, C.

- M. (2013). The impact of pretend play on children's development: A review of the evidence. *Psychological Bulletin*, 1-34. doi: 10.1037/a0029321
- Lin, W., Tsai, P., Lin, H., & Chen, H. (2014), How does emotion influence different creative performances? The mediating role of cognitive flexibility. *Cognition and Emotion*, 28, 834-844. doi: 10.1080/02699931.2013.854195
- Manosevitz, M., Fling, S., & Prentice, N. M. (1977). Imaginary companions in young children: Relationships with intelligence, creativity and waiting ability. *Journal of Child Psychology and Psychiatry*, 18, 73-78. doi:10.1111/j.1469-7610.1977.tb00418.x
- Matuga, J. M. (2004). Situated creative activity: The drawings and private speech of young children. *Creativity Research Journal*, 16, 267-281. doi:10.1207/s15326934crj1602&3_10
- Mayer, M. (1969). *Frog, where are you?* New York: Dial Books for Young Readers.
- Mendelsohn, G. A. (1976). Associative and attentional processes in creative performance. *Journal of Personality*, 44, 341-369.
- Milgram, R.M., & Milgram, N.A. (1976). Creative thinking and creative performance In Israeli students. *Journal of Educational Psychology*, 68, 255-259.
- Mohr, C., Graves, R.E., Gianotti, L.R.R., Pizzagalli, D., & Brugger, P. (2001). Loose but normal: A semantic association study. *Journal of Psycholinguistic Research*, 30, 475-483.
- Mottweiler, C. M., & Taylor, M. (2014). Elaborated role play and creativity in preschool age children. *Psychology of Aesthetics, Creativity, and the Arts*, 8, 277-286.
- Mouchiroud, C., & Lubart, T. (2002). Social creativity: A cross-sectional study of 6- to 11-year-old children. *International Journal of Behavioral Development*, 26, 60-69. doi:10.1080/01650250042000591
- Mullineaux, P. Y., & Dilalla, L. F. (2009). Preschool pretend play behaviors and early adolescent creativity. *The Journal of Creative Behavior*, 43, 41-57.
- Nusbaum, E. C., & Silvia, P. J. (2011). Are intelligence and creativity really so different?: Fluid intelligence, executive processes, and strategy use in divergent thinking. *Intelligence*, 39, 36-45. doi:10.1016/j.intell.2010.11.002
- Overton, W. F., & Jackson, J. P. (1973). The representation of imagined objects in action sequences: A developmental study. *Child Development*, 44, 309-314. doi:10.2307/1128052

- Pearson, D., Rouse, H., Doswell, S., Ainsworth, C., Dawson, O., Simms, K., Edwards, L., et al. (2001). Prevalence of imaginary companions in a normal child population. *Child: Care, Health and Development*, 27, 13-22. doi:10.1046/j.1365-2214.2001.00167.x
- Pepler, D. J., & Ross, H. S. (1981). The effects of play on convergent and divergent problem solving. *Child Development*, 52, 1202-1210. doi:10.2307/1129507
- Plucker, J. A., & Beghetto, R. A. (2004). Why creativity is domain general, why it looks domain specific, and why the distinction does not matter. In R. J. Sternberg, E. L. Grigorenko, J. L. Singer (Eds.), *Creativity: From potential to realization*. (pp. 153-167). Washington, DC: American Psychological Association.
- Ratchford, F. E. (1949). *The Bronte's web of childhood*. New York: Columbia University Press.
- Reilly, J. S., Bates, E. A., & Marchman, V. A. (1998). Narrative discourse in children with early focal brain injury. *Brain and Language*, 61, 335-375. doi:10.1006/brln.1997.1882
- Rhodes, M. (1961). An analysis of creativity. *Phi Delta Kappa*, 42, 305-310.
- Robson, S., Rowe, V. (2012). Observing young children's creative thinking: engagement, involvement and persistence. *International Journal of Early Years Education*, 20, 349-364. doi: 10.1080/09669760.2012.743098
- Root-Bernstein, M. (2014). *Inventing imaginary worlds: From childhood play to adult creativity across the arts and sciences*. Rowman & Littlefield: Lanham, Maryland.
- Root-Bernstein, M., & Root-Bernstein, R. (2006). Imaginary worldplay in childhood and maturity and its impact on adult creativity. *Creativity Research Journal*, 18, 405-425. doi:10.1207/s15326934crj1804.
- Runco, M. A. (1987). Interrater agreement on a socially valid measure of students' creativity. *Psychological Reports*, 61, 1009-1010. doi: 10.2466/pr0.1987.61.3.1009.
- Runco, M. A. (1996). Personal creativity: Definition and developmental issues. In M. A. Runco (Ed.) *Creativity from childhood through adulthood: The developmental issues*. *New directions for child development*, (pp. 3-30). San Francisco, CA: Jossey-Bass.
- Runco, M. A. (1999). Implicit theories. In M.A. Runco, & S. Pritzker (Eds.), *Encyclopedia of Creativity* (Volume 2, pp. 2-30). London: Academic Press.

- Runco, M. A. (2004). Creativity. *Annual Review of Psychology*, *55*, 657-687. Doi: 10.1146/annurev.psych.55.090902.141502.
- Runco, M. A. (2007). *Creativity: Theories and themes: research, development, and practice*. San Diego: Elvsevier.
- Runco, M. A. (2008). Commentary: Divergent thinking is not synonymous with creativity. *Psychology of Aesthetics, Creativity, and the Arts*, *2*, 93-96.
- Runco, M. A., & Charles, R. E. (1993). Judgments of originality and appropriateness as predictors of creativity. *Personality and Individual Differences*, *15*, 537-546.
- Runco, M. A., Dow, G., & Smith, W. R. (2006). Information, experience, and divergent thinking: An empirical test. *Creativity Research Journal*, *18*, 269-277. doi: 10.1207/s15326934crj1803_4
- Runco, M. A., Millar, G., Acar, S. & Cramond, B. (2010). Torrance tests of creative thinking as predictors of personal and public achievement: A fifty year follow-up. *Creativity Research Journal*, *22*, 361-368. doi: 10.1080/10400419.2010.523393
- Runco, M.A., & Pina, J. (2013). Imagination and personal creativity. In M. Taylor (Ed.), *The Oxford handbook of the development of imagination* (pp. 379-386). New York, NY: Oxford University Press.
- Russ, S. W. (2014). *Pretend play in childhood: Foundation of adult creativity*. Washington, DC: American Psychological Association.
- Russ, S. W., Robins, A. L., & Christiano, B. A. (1999). Pretend play: Longitudinal prediction of creativity and affect in fantasy in children. *Creativity Research Journal*, *12*, 129-139. doi: 10.1207/s15326934crj202_5
- Sadeh, A., Hen-Gal, S., & Tikotzky, L. (2008). Young children's reactions to war-related stress: a survey and assessment of an innovative intervention. *Pediatrics*, *121*, 46-53.
- Sandler, I. N., Tein, J. Y., & West, S. G. (1994). Coping, stress, and the psychological symptoms of children of divorce: A cross-sectional and longitudinal study. *Child Development*, *65*, 1744-1763.
- Sawyer, R. K. (2012). *Explaining creativity: The science of human innovation (2nd ed.)*. New York, NY: Oxford University Press.
- Sawyers, J. K., Moran, J. D., Fu, V. R., & Milgram, R. M. (1983). Familiar versus unfamiliar stimulus items in measurement of original thinking in young children. *Perceptual and Motor Skills*, *57*, 51-55. doi: 10.2466/pms.1983.57.1.51

- Schaefer, C. E. (1969). Imaginary companions and creative adolescents. *Developmental Psychology, 1*, 747-749. doi:10.1037/h0028270
- Skybo, T., Ryan-Wenger, N., & Su, Y. N. (2007). Human figure drawings as a measure of children's emotional status: Critical review for practice. *Journal of Pediatric Nursing, 22*, 15-28.
- Silvey, R., & MacKeith, S. (1988). The paracosm: A special form of fantasy. In D. C. Morrison (Ed.), *Organizing early experience: Imagination and cognition in childhood*, 173-197. Baywood Publishing Co.
- Silvia, P. J. (2011). Subjective scoring of divergent thinking: Examining the reliability of unusual uses, instances, and consequences tasks. *Thinking Skills and Creativity, 6*, 24-30. doi: 10.1016/j.tsc.2010.06.001
- Silvia, P. J., Winterstein, B. P., Willse, J. T., Barona, C. M., Cram, J. T., Hess, K. I., Martinez, J. L., et al. (2008). Assessing creativity with divergent thinking tasks: Exploring the reliability and validity of new subjective scoring methods. *Psychology of Aesthetics, Creativity, and the Arts, 2*, 68-85. doi:10.1037/1931-3896.2.2.68
- Simonton, D. K. (2007). Creativity: Specialized expertise or general cognitive processes? In M. J. Roberts (Ed.), *Integrating the mind: Domain general vs. domain specific processes in higher cognition* (pp. 351-367). New York: Psychology Press.
- Slobin, D. I. (2004). *Relating events in narrative, Volume 2: Typological and contextual perspectives*. Mahwah: Lawrence Erlbaum Associates Publishers.
- Smith, G. J. W., & Carlsson, L. M. (1990). The creative process: A functional model based on empirical studies from childhood to middle age.
- Smith, P. K., & Whitney, S. (1987). Play and associative fluency: Experimenter effects may be responsible for previous positive findings. *Developmental Psychology, 23*, 49-53.
- Smogorzewska, J. (2012). Storyline and associations pyramid as methods of creativity enhancement: Comparison of effectiveness in 5-year-old children. *Thinking Skills and Creativity, 7*, 28-37. doi: 10.1016/j.tsc.2011.12.003
- Spreen, O., & Strauss, E. (1998). *A compendium of neuropsychological tests: Administration, norms and commentary* (2nd ed.). New York: Oxford University Press.
- Starkweather, E. K. (1964). Problems in the measurement of creativity in preschool children. *Journal of Educational Measurement, 1*, 109-114.

- Starkweather, E. K. (1971). Creativity research instruments designed for use with preschool children. *The Journal of Creative Behavior*, 5, 245-255.
- Tahiroglu, D., Mannering, A. M., & Taylor, M. (2011). Visual and auditory imagery associated with children's imaginary companions. *Imagination, Cognition and Personality*, 31, 99-112.
- Taylor, M. (1999). *Imaginary companions and the children who create them*. New York: Oxford University Press.
- Taylor, M., Carlson, S. M., Maring, B. L., Gerow, L., & Charley, C. M. (2004). The characteristics and correlates of fantasy in school-age children: Imaginary companions, impersonation, and social understanding. *Developmental Psychology*, 40, 1173-1187. doi:10.1037/0012-1649.40.6.1173
- Taylor, M., Cartwright, B. S., & Carlson, S. M. (1993). A developmental investigation of children's imaginary companions. *Developmental Psychology*, 29, 276-285. doi:10.1037/0012-1649.29.2.276
- Taylor, M., Hodges, S. D., & Kohányi, A. (2003). The illusion of independent agency: Do adult fiction writers experience their characters as having minds of their own? *Imagination, Cognition and Personality*, 22, 361-380. doi: 10.2190/FTG3-Q9T0-7U26-5Q5X
- Taylor, M., Hulette, A. C., & Dishion, T. J. (2010). Longitudinal outcomes of young high-risk adolescents with imaginary companions. *Developmental Psychology*, 46, 1632-1636. doi:10.1037/a0019815
- Taylor, M., Mottweiler, C. M., Aguiar, N. A., Naylor, E. R., & Levernier, J. G. (in preparation). Imaginary worlds during middle childhood.
- Taylor, M., Mottweiler, C.M., Naylor, E.R., & Levernier, J.G. (2015). Imaginary worlds in middle childhood: A case study of two pairs of coordinated paracosms. *Creativity Research Journal*. doi:10.1080/10400419.2015.1030318
- Taylor, M., Sachet, A., Mannering, A. M., & Maring, B. L. (2013). The assessment of elaborated role-play in young children: Invisible friends, personified objects and pretend identities. *Social Development*, 22, 75-93.
- Tegano, D. W., Moran, J. D., & Godwin, L. J. (1986). Cross-validation of two creativity tests designed for preschool children. *Early Childhood Research Quarterly*, 1, 387-396. doi: 10.1016/0885-2006(86)90015-3
- Torrance, E. P. (1968). Examples and rationales of test tasks for assessing creative abilities. *The Journal of Creative Behavior*, 2, 165-178.

- Torrance, E. P. (1974). *The Torrance Tests of Creative Thinking: Technical-norms manual*. Bensenville, IL: Scholastic Testing Services.
- Torrance, E. P. (1981). *Thinking Creatively in Action and Movement*. Bensenville, IL: Scholastic Testing Service.
- Torrance, E. P. (2000). Preschool Creativity. In B. A. Bracken, (Ed.), *The Psychoeducational Assessment of Preschool Children*. Boston: Allyn and Bacon.
- Trawick-Smith, J., Russell, H., & Swaminathan, S. (2011) Measuring the effects of toys on the problem-solving, creative and social behaviours of preschool children. *Early Child Development and Care, 181*, 909-927.
doi: 10.1080/03004430.2010.503892
- Trionfi, G., & Reese, E. (2009). A good story: Children with imaginary companions create richer narratives. *Child Development, 80*, 1301-1313.
- Wallace, C. E., & Russ, S. W. (2015). Pretend play, divergent thinking, and math achievement in girls: A longitudinal study. *Psychology of Aesthetics, Creativity, and the Arts, 9*, 296-305.
- Wallach, M. A., & Kogan, N. (1965). *Modes of thinking in young children*. New York: Holt, Rinehart, & Winston.
- Wallas, G. (1926) *The Art of Thought*. New York: Harcourt Brace.
- Ward, T. B., Smith, S. M., & Finke, R. A. (1999). Creative cognition. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 189-212). Cambridge: Cambridge University Press.
- Ward, W. C. (1968). Creativity in young children. *Child Development, 39*, 737-54.
- Wechsler, D. (2003). Wechsler Intelligence Scale for Children-WISC-IV. Psychological Corporation.
- Weisberg, R. W. (2006). *Creativity: Understanding innovation in problem solving, science, invention, and the arts*. Hoboken: Wiley.
- White, H.A. and Shah, P. (2006). Uninhibited imaginations: creativity in adults with attention-deficit/hyperactivity disorder. *Personality and Individual Differences, 40*, 1121-1131.
- Wordsworth, W. (1919). "Ode: Intimations of immortality from recollections of early childhood" in A. Quiller-Couch (Ed.), *The Oxford Book of English Verse: 1250-1900* (pp. 609-616). Oxford: Clarendon.

Zelazo, P. D., Anderson, J. E., Richler, J., Wallner-Allen, K., Beaumont, J.L., & Weintraub, S. (2013). NIH Toolbox cognition battery (CB): measuring executive function and attention. *Monographs of the Society for Research in Child Development, 78*, 16-48.

Zeng, L., Proctor, R. W., & Salvendy, G. (2011). Can traditional divergent thinking tests be trusted in measuring and predicting real-world creativity? *Creativity Research Journal, 23*, 24-37. doi: 10.1080/10400419.2011.545713