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Examining the Validity of the Preschool Kitchen Task Assessment

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A Thesis Submitted in Partial Fulfillment of the Requirement for the Degree

Master of Science in Occupational Therapy

School of Health and Natural Sciences

Dominican University of California

San Rafael, California

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This thesis, written under the advisement of Julia Wilbarger Ph.D., OTR/L, and approved by the chair of the program, Ruth Ramsey Ed.D., OTR/L, has been presented and accepted by the faculty of the Occupational Therapy Department in partial fulfillment of the requirements for the degree of Master of Science in Occupational Therapy. The content and research methodologies presented in this work represent the work of the candidates alone.

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Abstract

Background and purpose. Executive function (EF) skills are necessary to set a strong foundation for play development, school readiness and social participation in young children. However, few ecologically valid assessments are available to detect potential executive function deficits in preschool aged children. The Preschool Kitchen Task Assessment (PKTA) is a new tool that measures EF in preschool aged children. The PKTA was adapted from the Kitchen Task Assessment and The Children Task Assessment by Christine Berg, Ph.D., OTR/L. This study aimed to validate the PKTA as an ecological assessment of EF in preschool aged children.

Subjects. Twenty-four typically developing children ages three to five and their parents from three preschools in Marin County.

Methods. An exploratory research design was utilized to examine the ecological validity of the PKTA. Scores from the PKTA were compared to three established neuropsychological assessments using Pearson's *r* correlation.

Results. Weak and non-significant correlations were found between the PKTA and the three established neuropsychological assessments: The Behavior Rating Inventory of Executive Function – Preschool Version Parent Form (BRIEF-P), Dimensional Change Card Sort (DCCS), Forward Digit & Backward Digit Span (FDS & BDS). A strong negative significant relationship was found between the participant's age in months and their total score on the PKTA.

Discussion and conclusion. The findings do not support the validity of the PKTA as an assessment tool for EF in preschool aged children. The PKTA may be a useful ecologically valid assessment of developmental milestones in preschoolers.

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Introduction

Executive Function (EF) skills are not only important during adulthood, but also during childhood (Pritchard & Woodward, 2011). EF abilities enable young children to plan, initiate, and complete tasks such as: activities of daily living (ADL) and instrumental activities of daily living (IADL), while controlling their emotions, staying focused, and responding to the feedback given by other individuals. The interest in EF in young children has grown in relation to increased behavior expectations in classroom activities as well as in social activities (Pritchard & Woodward, 2011). EF skills are components of mental processes that include: attention, inhibitory control, nonverbal and verbal working memory, planning, and problem solving (Beer, Castellanos, Colson, Henning, & Pison, 2014). The gradual development of EF is crucial during the preschool years because EF skills help to build a strong foundation for school readiness and future academic success as well as supporting play, and social participation (Beer et al., 2014; Allan, N.P., Allan D. M., Farrington, & Longian, 2014; Espy, McDiarmid, Cwik, Stalets, Hamby, & Senn, 2004; Ponitz, McClelland, Matthews, & Morrison, 2009; Garon, Bryson, & Smith, 2008). Therefore, in order for preschoolers to engage in meaningful activities across multiple contexts, it is important that occupational therapists (OTs) provide early intervention and have appropriate as well as effective tools to assess EF in preschool-aged children.

Given the importance of EF across a wide range of areas, it is vital that these skills are assessed during early childhood. Occupational therapists (OTs) focus on identifying potential developmental delays associated with EF in order to optimize and enhance children's occupational performance. Currently, there are many established tools that measure deficits of EF in older children and adults. However, there are limited ecologically valid assessments that focus on the development of EF in preschool aged children. Christine Berg, Ph.D., OTR/L,

FAOTA, recently created The Preschool Children Task Assessment (PKTA), a new performance-based assessment tool that evaluates EF in preschool children between the ages of three to five. The PKTA is based on the adult's Kitchen Task Assessment (KTA) and the Children's Kitchen Task Assessment (CKTA) (Baum & Edwards, 1993; Rocke, Hays, Edward, Berg, 2008). Due to its recent creation, there is little evidence supporting the validity and reliability of this assessment. Therefore, the purpose of the study was to establish the PKTA as an ecologically valid measure of EF in preschool age children. Having an effective and reliable tool that assesses EF in preschool children will enable OTs to identify potential EF deficits and provide early intervention.

Literature Review

Executive Function and Core Components

Executive functions (EF) are cognitive processes that are linked to complex thought and goal-directed behaviors (Kerns, Nuechterlein, Braver, & Barch, 2008). Major EF activities are linked to neural network systems and the prefrontal cortex (Miyake et al., 2000). Behaviors such as selecting and inhibiting appropriate responses, controlling behaviors, and properly interpreting social cues are essential occupational performance skills that are mediated by EF in the brain (Cramm, Krupa, Missiuna, Lysaght, 2013; Miyake et al., 2000). Studies indicate that the core components of EF include: working memory, inhibitory control, cognitive shifting, as well as planning and organizing (Center on the Developing Child at Harvard University, 2011; Garon, Bryson, & Smith, 2008; Miyake et al., 2000).

Working Memory. Working memory is the ability for young children to store information and to actively manipulate the information in their mind (CDCHU, 2011). The ability to carry out multi-step instructions such as tying their shoelaces, recalling a friend's name,

or remembering rules for a game are examples of working memory. Preschoolers with deficits in working memory may have difficulty in remembering directions in class or tracking what they were doing.

Inhibitory Control. Inhibitory control is the skill a child uses to withhold or filter his or her thoughts or behaviors (Garon, Bryson, & Smith, 2008). Filtering one's thoughts and impulses are often utilized as a way to steer away from distractions and to think before acting (CDCHU, 2011). Children use these skills when playing games such as Simon Says. Inhibitory control also prevents a child from interrupting when a peer or teacher is speaking during a conversation. Children who have limited inhibitory skills may cut in line or have difficulty sitting still for appropriate periods of time (Blasco, Saxton, & Gerrie, 2014). Deficits in this component of EF may impact children's occupational performance in school and social settings.

Shifting. Shifting also known as cognitive flexibility, involves adapting to changes in one's mindset, priorities, or demands (CDCHU, 2011). In essence, shifting assists one to identify mistakes and enables the individual to fix or to find alternatives to approach new information (CDCHU, 2011). This component of EF helps a child adapt or re-direct one's attention such as playing kickball then stopping to tie his or her shoelace then shifting back to playing kickball (CDCHU, 2011; Gary, Bryson, & Smith, 2008). A child with limited skills in shifting, may experience difficulties in adapting to new rules to an old game.

Planning and Organizing. Planning and organizing refers to the ability to achieve a goal by following through a sequence of series of actions (Blasco, Saxton, & Gerrie, 2014). An example of planning and organizing in a young child can be demonstrated when a child is able to don his or her own clothes. The child would need to sequence through the process of donning his or her clothes by putting on the shirt, the pants, the socks, then the shoes. A child who lacks the

ability to plan and organize may not be able to successfully complete the task and may make mistakes such as attempting to put on his or her shoes before donning the socks first.

Preschool years serve a critical period in the early development of EF (Pritchard & Woodward, 2011) thus, for children to be able to succeed in school readiness, social participation, and play engagement, a solid foundation of EF skills is necessary (CDCHU, 2011; Blasco, Saxton, & Gerrie, 2014).

Executive Function Among Preschoolers

School Readiness. Between the ages of three to five many children may have already developed the capability to maintain focus, conduct self-organizational skills, and perform multi step-tasks (CDCHU, 2011). The interplay of a child's EF such as working memory, inhibitory control, and cognitive flexibility is a pivotal time that contributes to typical development in preschool children's school readiness (Pritchard & Woodward, 2011). Through a meta-analysis study, researchers found that the critical time for the development of inhibitory control is preschool age (Allan et al., 2014). Furthermore, researchers suggest that inhibitory control, working memory, and mental flexibility are strongly associated with the development of math and literacy skills in reading as well as writing for children (Allan et al., 2014; Espy et al., 2004; Ponitz, McClelland, Matthews, & Morrison, 2009).

Social Participation and Play. During normal development, friendships are first established in preschool age (Howes, Hamilton, & Philipsen, 1998). Social skills such as sharing, turn-taking, and cooperating are developed and acquired through multiple peer interactions (Bierman, Torres, Domitrovich, Welsh, & Gest, 1998; Howes, Hamilton, & Philipsen, 1998). The ability to take turns and be aware of one's social aspects in conversation is supported by development of self-regulation skills (CDCHU, 2011). In addition, researchers

found that children who were able to self-regulate and not interrupt in conversations, had strong EF skills in the area of inhibition (Blain-Briere, Bouchard, & Bigras, 2014). However, deficits in self-regulation in children may lead to detrimental social challenges within their group. Thus, EF plays a vital role in the development of friendships and social participation in preschool-aged children. In addition, providing young children with opportunities to acquire and build EF skills during early childhood is crucial because of their impact in the healthy development of middle childhood and adulthood (CDCHU, 2011). Nevertheless, researchers indicate that children who have impaired EF due to neurodevelopmental disorders experience negative impact across their lifespan (CDCHU, 2011, Cramm et al, 2013).

Conditions with Impaired Executive Function

Executive function deficits have been associated with several neurodevelopmental disorders including autism and attention deficit hyperactivity disorder (Marzocci et al., 2008; Hosenbocus & Chahal, 2012). Recent studies have found that children with low birth weight and children with fetal alcohol spectrum disorder (FASD) also display deficits of EF (Blasco, Saxton & Gerrie, 2014). Children with EF struggle in academics especially in math, reading, and writing and also exhibit behavioral problems (Bull, Espy & Wiebe, 2008; Bull & Scerif, 2001; Henry, Messer, & Nash, 2012; Marzocchi et al., 2008; Reiter, Tucha & Lange, 2004). It is clear that occupational performance in educational and social participation activities are greatly impacted in children with EF deficits (Blasco, Saxton & Gerrie, 2014).

Attention Deficit Hyperactivity Disorder (ADHD). Children with attention deficit hyperactivity disorder (ADHD) present inattention and hyperactivity as impulsivity (American Psychiatric Association, 2013). ADHD is characterized by a pattern of behavior, present in multiple contexts such as school and home that can result in performance issues in social,

educational, or work settings (American Psychiatric Association, 2013). Behavioral problems due to EF dysfunction may include: inability to pay close attention to details, difficulties organizing tasks and activities, excessive talking and fidgeting, and inability to remain seated in some situations (Honsenbocus & Chahal, 2012). All these challenging behaviors correspond to difficulties in areas of EF including time management, planning and organization, initiation and completing tasks in a timely manner, shifting, and working memory (Honsenbocus & Chahal, 2012). Children with ADHD also experience challenges in the EF area of impulse control (Hosenbocus & Chahal, 2012), which can be reflected in blurting answers out, completing a task without thinking through, and exhibiting difficulties with taking turns or waiting turns (American Psychiatric Association, 2013).

Autism Spectrum Disorder (ASD). Autism is characterized with abnormal or impaired development in social interaction, communication, as well as a markedly restricted repertoire of activity and interest (American Psychiatric Association, 2013). Several studies indicate that children, adolescents and adults with ASD experience deficits in executive function (Hill, 2004; Hosenbocus & Chahal, 2012; Rosenthal et. al, 2013). Hosenbocus and Chahal (2012) reported that children diagnosed with autism present deficits in EF, particularly in the areas of planning ability, mental flexibility, and inhibition. Other researchers suggest that some of the social skills in individuals with autism are impacted by executive function deficits, particularly the need to stick to routines, a strong liking for repetitive behaviors, difficulty initiating non routine tasks, lack of impulse control, and difficulty transitioning between tasks (Ozonoff, Pennington, & Rogers, 1991; Hill, 2004; Rajendran & Mitchell, 2007).

Fetal Alcohol Syndrome (FAS). Fetal Alcohol Syndrome (FAS) is found in children who had exposure to alcohol before birth (Green, Mihic, Nikkel, Stade, & Rasmussen, 2009).

Executive function deficits in the frontal lobe have been associated with prenatal alcohol exposure (Honsenbocus & Chahal, 2012). According to some researchers, most children with FAS struggle with learning and working memory (Green et al., 2009). Other researchers agree that some children with FAS may also struggle with complex adaptive behaviors that require the integration of set-shifting, planning and strategy use, attention and spatial working memory, longer reaction and decision time. Rassmussen (2008) states that weak inhibitory control in addition to difficulty understanding consequences of actions are common pattern in children with FAS, and tend to lead to negative behaviors such as lying and deceiving others.

Low Birth Weight (LBW). Low birth weight can be defined as the birth weight of a live born infant of less than 2,500 g (5 pounds 8 ounces) regardless of gestational age (Anderson & Doyle, 2003; McGrath & Sullivan, 2002). Lower gestational ages are typically associated with lower birth weights. Infants with LBW are at risk for numerous medical complications, including difficulties related to their underdeveloped brain, heart, lungs, gastrointestinal and digestive organs. Children with LBW can be at great risk for developing learning disabilities due to difficulties with attention and self regulation (Anderson & Doyle, 2003; McGrath & Sullivan, 2002).

Brain Injury. Traumatic brain injury (TBI) is the leading cause of acquired disability in young children (Chapman, Wade, Walz, Taylor, Stancin, & Yeates, 2010). Anderson, Fenwick, Manly and Robertson (1998) agree that attention, concentration, impulse control, and judgement are the cognitive areas affected the most in children with TBI. Recent studies also indicate that EF is the link between children's resilience and social development, therefore, children with brain injury tend to be less resilient, but more depressed and anxious than typically developing children (Catale, Marigue, Closset, & Meulemans, 2009). Moreover, EF deficits in children with

brain injuries may impact their overall functional performance in diverse contexts including home, school, and community (Chapman et al., 2010).

Executive Function in Occupational Therapy

Importance of Executive function in OT. Cognition is vital to human development because it allows learning, processing, and retaining new information, in order to respond to changes in everyday life. EF is a subset of cognition involved in planning, initiating, and completing tasks which critically impacts occupational performance, engagement, and participation in everyday activities (Morrison et al., 2013). Recent studies indicate that healthy development of EF in young preschool age children is crucial for the appropriate development of academic skills such as literacy and math (CDCHU, 2011). Moreover, EF also contributes greatly to the appropriate development of social and behavioral skills, such as turn taking, and circle time participation (Beer, et al., 2014).

Occupational therapists evaluate and address cognitive functions in individuals as a way to support occupational performance across all contexts of life (AOTA, 2013). Early assessment of EF deficits in preschool age children enable occupational therapists to develop interventions that can facilitate and promote successful occupational performances in areas of occupation, such as activities of daily living (ADLs), instrumental activities of daily living (IADLs), and school participation.

Assessment of Executive Function

EF skills are important in the overall neuropsychological functioning of the developing child and are essential in the child's cognitive, behavioral, and social-emotional development (Isquith, Crawford, Espy, & Gioia, 2005). Therefore, finding reliable and valid assessment tools

to measure EF in children is crucial for OTs to identify potential deficits and develop preventative therapeutic interventions that reflect the unique needs of the child, thus supporting engagement and occupational participation. Throughout the years, several neuropsychological assessments have been used to measure different areas of EF in children.

Neuropsychological Assessments. The Wechsler Intelligence Scale for Children IV (WISC-IV) Digit Span (Wechsler, 2003) for example, has been widely used to assess working memory, concentration and attention. The task requires a child to repeat a number of digits forward and then backwards. Another neuropsychological assessment used in children is the Delis-Kaplan Executive Function System (D-KEFS). This assessment measures inhibition, problem solving, impulse control, concept formation, abstract thinking, and creativity in children (Delis, Kaplan & Kramer, 2001). The Delis–Kaplan Executive Function System Color-Word Interference Test *(*Delis, Kaplan, & Kramer, 2001) is also a subtest of the D-KEFS, which utilizes free sorting and sorting recognition of cards tasks to measure concept formation as well as problem solving skills. However, these common assessments of EF mentioned above are not appropriate for preschoolers as they are intended to be used for older children and adults ages eight through 89 years.

Assessments that are appropriate measures of EF in preschool-age children include: The Trail Making Test- Preschool Version, TRAILS-P (Espy, McDiarmid, Cwik, Stalets, Hamby, & Senn, 2004) and The Shape School (Espy, 1997). The TRAILS-P is a modification of the trail making test and measures children's ability to shift cognitive set. The Shape School (Espy, 1997) includes the completion of an executive function task that involves pictures of objects and manual responses. It has been used in preschool children and is sensitive to developmental maturation.

In addition to the neuropsychological assessments mentioned above, other tests have also been used in research to measure EF in children. One of the assessments is The Prohibited Toy Protocol (Rasmussen et al., 2008). This tool measures self-control while the child and the examiner play a guessing game. Another assessment used in research is the Backward Digit Span (Davis & Pratt, 1995), which measures verbal working memory. This test consists of having the child repeat a series of numbers backwards. The Dimensional Card Sort (DCCS; Diamond, Carlson, & Beck, 2005) is also a test of EF used with preschool children. The DCCS measures flexibility while the child is asked to sort cards according to either color or shape. Another neuropsychological test that measures EF is the Tower of Hanoi (Welsh et al., 1991), which measures planning and inhibition. In this assessment, the child is asked to move three rings of different sizes around on pegs using the least number of moves.

Ecologically Valid Assessments. When addressing a child's occupational performance, it is crucial that the child's performance is measured in a manner that is generalizable and natural (Schmuckler, 2001). Assessing a child in an environment that is artificial may elicit behaviors that are not true to the child (Schmuckler, 2001). The ability to observe a child in his or her own natural environment also enable OTs to identify strengths and potential areas of need that may enhance or inhibit the child's participation and occupational performance (Rocke, et al, 2008). An ecological assessment is a comprehensive process in which data is collected on how a child functions in different environments or settings. Thus, the availability of reliable ecological assessment tools for screening and assessing EF in preschool children are vital for OTs. Having the ability to measure a child's EF function in various environments or settings is important to understand the child as a whole. Currently, the Behavior Rating Inventory of Executive Functioning-Preschool Version parent form (BRIEF-P) was developed by psychologists. The

authors of this assessment consider the BRIEF-P to be an ecologically valid standardized assessment in EF. The BRIEF-P is considered to be ecologically valid because parents are able to report the child's behaviors and executive functioning in one's natural home environment (Gioia, Espy, & Isquith, 2003).

The Assessment of Motor and Process Skills (Fisher, 2003) and the School Assessment of Motor and Process Skills (Fisher, Bryze, Hume, & Griswold, 2005) are also standardized ecologic valid tests developed by OTs. These tool assessments measure motor and processing skills during a variety of daily living tasks in home and in school environments. However, they are not age appropriate for preschoolers and they do not evaluate specific executive function skills or determine the level of assistance required to complete the task. In addition, extensive training is required to be qualified to administer these tests.

The Kitchen Task Assessment (KTA) is another tool utilized in occupational therapy to measure executive function skills, but in adults with dementia. The KTA is a standardized performance based assessment that measures: initiation, organization, performance of all steps, judgement and safety, and completion (Baums & Edwards, 1993). In the KTA, the adult is asked to follow a given recipe to make cooked pudding. The total score of the assessment is based on the level of assistance the person required to complete the task.

Adapted from the KTA is the Children's Kitchen Task Assessment (CKTA). Similar to the KTA, the CKTA measures components of EF such as: initiation, sequencing, safety and judgement, working memory, and organization in children ages 8-12. In this assessment, the child is asked to follow a recipe to make play dough. The score is based on the level of assistance required for the child to complete the task.

Due to the need of having ecological assessments of EF in younger children, Christine Berg, Ph.D., OTR/L, FAOTA at Washington University, St. Louis, recently adapted the CKTA to be used in preschool age children (Berg, 2009). Similar to the KTA and CKTA, the PKTA also measures initiation, sequencing, safety and judgement, working memory, and organization. The assessment also involves the completion of an activity in an environment that is familiar to the child's preschool. The PKTA activity requires that the child follows multiple steps to create an art and craft picture of a caterpillar. The child is given a box of required materials and a picture book that includes the steps to follow to complete the activity. The total score of the assessment is based on the level of assistance that the child needed to complete the task.

One unpublished master's thesis study utilized the PKTA to assess EF skills of 11 preschool age children (Yuson, Engelhardt, & Dizon, 2014). In order to examine and determine if this tool is an ecologically valid tool of EF in younger children, further studies are required. Previous research studies have helped determine the validity and reliability of the CKTA as a measure of EF in children. Since the PKTA has been adapted from the CKTA, it is possible that the validity of the PKTA can also be established. The development and evaluation of the PKTA as an ecologically valid assessment is important because it could help assist OTs and other professionals in developing treatment and educational plans that can support preschool children in successful performance across different settings.

Statement of Purpose

Previous research has indicated that EF is an important aspect in the prediction of academic success and social participation in elementary school (CDCHU, 2011; Pritchard & Woodward, 2011) and that early intervention may improve the development of EF skills in children (Cramm et al., 2013). Thus, OTs will benefit from using reliable and valid tools to

assess EF in the preschool years, in order to develop interventions focused on the unique needs of children and that can support their occupational performance and engagement in all areas of occupation. However, assessing preschoolers may be challenging due to the limited ecologically valid assessments available and because at this age children may have a hard time attending to lengthy assessment tasks. Therefore, the purpose of this exploratory study was to establish general and ecological validity of the PKTA as an assessment tool of EF in children age three to five.

The researchers have formulated the following questions to guide this study:

1. Is the PKTA a valid measure of executive function as determined by comparing the scores of PKTA to other neuropsychological assessment tests?
    a.) Is there a correlation between PKTA and the Behavior Rating Inventory of Executive Function (BRIEF-P).
    b.) Is there a correlation between PKTA and the Forward and Backward Digit Span?
    c.) Is there a correlation between PKTA and the Dimensional Change Card Sort?
2. Do PKTA scores decrease with age in months?
3. Is the PKTA an ecologically valid assessment tool to measure EF in preschool children as measured by observation, of level of engagement, and motivation?

Theoretical Framework

The Ecology of Human Performance (EHP) guided the theoretical approach to this research study. The EHP model is based on the interrelationship between the four constructs: person, task, performance, and context (Dunn, Brown, & McGuigan, 1994). Along with the four

constructs, the EHP strongly emphasizes the importance of utilizing appropriate techniques for interventions and preventions that can help address deficits in meaningful areas of occupation.

Executive function deficits for preschool-aged children can affect problem solving, social participation, school readiness, and play skills (CDCHU, 2011). Preschoolers with deficits in EF may struggle day to day with tasks such as adhering to game rules, interacting with one's peers, and paying attention in class. However, early intervention can provide a child with various opportunities to successfully participate in age appropriate occupations. Through the use of an ecological assessment such as the PKTA, children will have the opportunity to be assessed in an environment that is natural which will elicit behaviors that are true to the child (Schmuckler, 2001).

Constructs of Ecology of Human Performance

Person. A person is an individualistic entity that holds various life experiences, interests, roles, and performance skills (Dunn, Brown, & McGuigan, 1994). In the PKTA, the focus is to examine EF skills such as self-regulation, working memory, and problem solving skills in preschool aged children. The appropriate development of these skills directly affects children's occupational performance and influence their school readiness and social participation.

Task. The second construct in the EHP framework is task. Task can be described as occupations that an individual chooses to participate in (Dunn, Brown, & McGuigan, 1994). The PKTA provides children with the opportunity to actively participate and engage in a fun arts and craft project that can be meaningful and appropriate to their age.

Context and Performance. Contexts can be described as are temporal, physical, social, and cultural elements of one's environment (Dunn, Brown, & McGuigan, 1994). The PKTA strongly emphasizes on the importance of providing an environment that is natural and

generalizable to the larger preschool aged population. Thus, increasing the validity and reliability of this assessment may provide OTs with effective measurement tools to make a thorough assessment of cognitive skills that are emerging and developing during preschool age. With appropriate support from their natural environment (preschool, daycare, home) and through positive interactions from their family, their teachers and their peers, children may develop appropriate EF skills that will impact their emerging roles and their performance across different contexts such as school and home.

The Ecology of Human Performance framework uses a variety of intervention strategies such as: alter, adapt, prevent, create, and establish to help individuals maximize their occupational performance. As previously mentioned, the use of the PKTA to assess preschool-aged children may support OTs in evaluating and detecting potential EF deficits and consequently, develop interventions based on the ones proposed by the EHP framework. In addition to measuring EF skills, the PKTA task can also allow OTs to observe other important developmental skills in children such as fine motor skills because the art craft requires that the child manipulates various objects and tools including scissors, crayons, and glue caps, among others.

Methods

Design

This study examined the validity of PKTA as a performance-based assessment for evaluating executive function in preschoolers. A non-experimental exploratory design was implemented to compare scores from the PKTA (dependent variable) with scores from established neuropsychological assessments (independent variables): BRIEF-P Preschool Version, Forward Digit Span (FDS) and Backward Digit Span (BDS), and Dimensional Change

Card Sort (DCCS). In addition to the assessments mentioned above, further data was obtained through observation of the participants while completing the assessments and through questionnaires completed by the parents about the participant's background.

Participants

This study included 24 typically developing children that were between the ages of three and five. Exclusion criteria included children with limited English fluency as well as a diagnoses affecting EF skills, such as children with autism spectrum disorder, ADHD or brain injury. The study also excluded children with limited English skills and children with sensory motor or neuropsychological limitations that may have interfered with the completion of the PKTA task. Twenty four participants were recruited from Bay area preschools. The parents of the preschool children were provided with a packet containing a consent form, a background questionnaire, a follow-up questionnaire, and the Behavior Rating Inventory of Executive Function-Preschool Version (BRIEF-P). The parents completed these forms in a setting of their choosing and returned the forms in a sealed envelope to the children's preschool teacher. All procedures including the informed consent process were approved by the Dominican University of California Institutional Review Board.

Instruments

PKTA. The Preschool Kitchen Task Assessment was adapted from the Children's Kitchen Task Assessment (Rocke, Hays, Edwards, & Berg, 2008). This assessment examines EF of preschool aged children by determining the level of assistance the children require to be able to complete a specific task.

The PKTA task required the child to assemble a picture of a caterpillar using a box of required materials. At the beginning of the PKTA task, the researcher provided the participant

with a recipe book that contained pictures of the steps needed to assemble the caterpillar craft. In addition, the researchers told the child that all materials needed were in the provided box and that the child should try to complete the task independently. The PKTA scores were determined by the level of assistance (cues) needed for the completion of each step of the task. The following levels of assistance included: no cues (0), verbal guidance (1), gesture guidance (2), direct verbal assistance (3), physical assistance (4), and do for participant (5). Participants in this study were given cues after 10 seconds, for processing and problem solving. Participants were cued before 10 seconds only if the child appeared to be in an unsafe situation or was about to damage the art and craft project. At the completion of the task, each participant's level of assistance, time and total score was calculated. The researchers also determined a composite score and a weighted score.

The PKTA Before Task is a questionnaire that was given to the participants prior to the administration of the PKTA. The researcher asked a series of questions to each child individually to determine the level of assistance he or she may need to complete the task. After the completion of the PKTA task, the researchers administered the PKTA After Task Questionnaire. This questionnaire included a series of questions to determine the level of assistance the child needed during the PKTA task, his or her thoughts about how he or she did during the task, and what he or she could have done differently during the completion of the art project.

Forward and Backwards Digit Span. The Forward and Backward Digit Span (FDS & BDS) was used to measure the participant's working memory. The examiners administered the Davis and Pratt protocol (1995), using a sock puppet named Ernie, and reading aloud a series of numbers from the scoring sheet. The researchers recorded the longest series of numbers that the

participant repeated forward and backwards. Each child received a score for the longest series of numbers he or she was able to repeat. For example; if the child repeated two numbers, the score level he or she received was two. The examiner continued to repeat numbers until the child failed to repeat the sequence in three given trials.

The Behavior Rating Inventory of Executive Function-Preschool Version. The Behavior Rating Inventory of Executive Function- Preschool Version Parent Form (BRIEF-P) is a standardized questionnaire that was created to measure EF skills of preschool age children ages 2-5 (Gioa, Espy, & Isquith, 2003). The BRIEF-P ratings form is to be used by parents, teachers, or caregivers to rate the child's EF skill in the natural context of his or her everyday environments (home and school).

The BRIEF-P scales include Inhibit, Shift, Emotional Control, Working Memory, and Plan/Organize. This assessment also has three broad indexes (Inhibitory Self-Control, Flexibility, and Emergent Metacognition), one overall composite score Global Executive Composite, and two validity scales (Inconsistency and Negativity). The BRIEF-P has high internal consistency reliability of 0.80-0.95 for the parent sample and 0.90-0.97 for the teacher sample (Gioa, Espy, & Isquith, 2003). The BRIEF-P also has a moderate test-retest reliability of 0.78-0.90 for the parent sample and 0.64-0.94 for the teacher sample (Gioa, Espy, & Isquith, 2003). The BRIEF-P is an ecologically valid tool for screening and assessing child's development as well as EF skills (Gioa, Espy, & Isquith, 2003).

The Dimensional Change Card Sort. The Dimensional Card Sort (DCCS) by Diamond, Carlson, & Beck, 2005) was used to measure cognitive flexibility in the participants. During the administration of this test, the researchers showed each child two target pictures that vary along two dimensions: shape and color. First, the child was asked to match pictures

according to color, then after a specific number of trials, the child was asked to match the pictures according to shape. Scoring was based on a combination of accuracy and reaction time.

Procedures and Data Collection

A child was considered a participant, once parental consent was obtained. The Parent Form of the BRIEF-P was sent to parents to obtain information about the participant's behavior along with the background questionnaire to obtain further information about the participant. The children were tested in a quiet area of their preschool classroom while peers and teachers were around to ensure a familiar and natural environment. All researchers were trained in the administration of the assessments prior to testing the participants. The researchers started the testing first by administering the FDS & BDS, then the DCCS, and at the end the PKTA. Prior to the beginning of the PKTA, the researcher verbally delivered the PKTA Before Task questionnaire to the child. Once, the child completed the PKTA task, the researcher verbally conducted the PKTA After Task questionnaire. To ensure reliability, participants were videotaped during the performance of the PKTA.

Data Management Analysis

Descriptive statistics for all demographic and test scores were calculated and examined for outliers and to determine if the data met the assumptions for use of parametric statistics. Data from this study was analyzed with a series of Pearson's *r* correlation coefficient to compare and examine the relationship between the PKTA scores and the scores on the three standardized neuropsychological tests of executive function: the BRIEF-P, the FDS & BDS, and the DCCS. In addition, the researchers also reviewed and analyzed the recordings of the participants' PKTA performance in order to ensure reliable administration of the PKTA.

Ethical and Legal Considerations

To ensure the protection of the participant's right, prior to the beginning of this study a research approval was obtained by the Institutional Review Board for the Protection of Human Participants (IRBPHP) at Dominican University of California. After it was determined that the rights and well-being of all participants were upheld by the researchers, approval was given to conduct the study. Recruitment of participants was accomplished by sending informative flyers to parents of children attending preschools in Marin County. Prior to the study, written consent was obtained by the participant's parents or legal guardians and they were also asked to complete the BRIEF-P and a background questionnaire about the participant's. On the day of testing, the researchers made sure to request and receive verbal assent from each child at a time before the administration of the assessments. The participants were also informed that they had the right to withdraw from the study at any given time. Each child was administered the same battery of assessments which included the Forward and Backward Digit Span (FDS & BDS), the Dimensional Change Card Sort (DCCS), and the PKTA. The researchers abided by the American Occupational Therapy Association Code of Ethics by upholding the principles of beneficence, non-maleficence, autonomy and confidentiality.

Results

Twenty four participants ranging in ages between 36 to 66 months completed the study. Data was collected over 24 months and from three different preschools. Table 1 includes information about the participants' demographic information. As seen in the table, a higher proportion of the participants were male (54.2%), the majority were white non-Hispanic (70.8 %) the Mean in age in months was 51.4 and the Standard Deviation was 8.4 month

Table 1

Participant Demographic Data

Child Characteristic	
Participant	*n* = 24
Child Variables	
Age in Months (M)	51.4
Age in Months (SD)	8.4
Gender, n (%)	
Male	13(54.2)
Female	11(45.8)
Race, n (%)	
White, Not Hispanic	17(70.8)
Asian or Pacific Islander	2(8.3)
Hispanic	3(12.5)
Other, Unknown	2 (8.3)

Note. M = mean; *SD* = standard deviation.

Relationship between PKTA and BRIEF-P

As seen in table 2, all correlations between the total scores on the PKTA and the clinical scales in the BRIEF-P were weak and non-significant. All of the correlations with the PKTA total score and time with BRIEF-P were small and non-significant. PKTA time and BRIEF-P shifting had a moderate but non-significant correlation (r = .27). PKTA time and BRIEF-P Flexibility Index had a moderate but non-significant correlation (r = .31).

Table 2

Correlation Scores between PKTA Total Score and Time with BRIEF-P Clinical Scale, Indexes, and Global Executive Composite (Pearson Correlation) r = n

BRIEF-P	Score	Time
Clinical Scales		
Working Memory	-.07	.03
Inhibitory Control	.06	.13
Shifting	-.08	**.27**
Emotional Control	.04	.20
Planning/Organizing	-.12	.03
Indexes		
ISCI	.05	.19
FI	.00	**.31**
EMI	-.11	.02
Global Executive Composite	-.02	.10

Note. Fair or better correlations (r > .25) are in bold. BRIEF-P = The Behavior Rating Inventory of Executive Function. PKTA = Preschool Kitchen Task Assessment. ISCI = Inhibitory Self-Control Index. FI = Flexibility Index. EMI = Emergent Metacognition Index.

Relationship Between PKTA and FDS and BDS

As reported in Table 3, weak non-significant correlation was found between the PKTA total score and FDS (r = .18). A moderate but non-significant correlation was found between the PKTA total score and the total score of the BDS (r = -.25).

Relationship Between PKTA DCCS

As noted in Table 3, weak non-significant correlation was found between the PKTA total score and the total score of the DCCS (r = -.09).

Table 3

Correlation Scores between Total Score on PKTA and the Neuropsychological Assessments

Neuropsychological Assessments	PKTA Total Score (Pearson r Correlation)
BRIEF-P	-.02
DCCS	-.09
FDS	.18
BDS	**-.25**

Note. Fair or better correlation (r >.25) are in bold, no relationships are significant. PKTA = Preschool Kitchen Task Assessment. DCCS = Dimensional Change Card Sort. FDS = Forward Digit Span Task. BDS = Backward Digit Span Task.

Relationship of Age Sensitivity to PKTA Score

As seen in Figure 1, a strong negative significant correlation was found between the age of the participant in months and their total score on the PKTA (r = -.58). As the child's age increased, their score on the PKTA tended to decrease. These results indicate improvement of EF with age.

Figure 1

Relationship of PKTA Score to Age

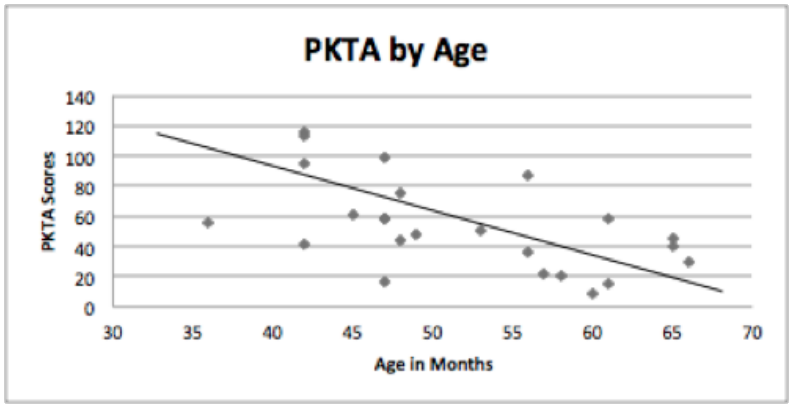

Figure 1. Scatter plot of the child's age on the x-axis and the PKTA Total Score on the y-axis. The PKTA total score for each participant is represented by the circles. The straight black line shows a strong negative correlation (r = -.58).

Qualitative Observations

At the beginning of the PKTA, child participants demonstrated a high level of interest to begin the task when compared to other neuropsychological assessments. Many children showed curiosity and intrigue with the activity by asking when they could start the project, looking at the materials in the box, and requesting if they could keep the completed work. During the PKTA task most of the children appeared to enjoy engaging in the activity by smiling, matching their work with the recipe book, and taking time in completing each step of the task. In addition, while children completed the PKTA task, researchers were able to observe various developmental skills such as visual motor, fine motor, visual perceptual, sensory processing, and social referencing.

Discussion

This study examined the general and ecological validity of the PKTA as a measure of EF skills in preschool-aged children. The scores of the PKTA were compared to four established neuropsychological assessments in order to establish the validity of the PKTA. No meaningful relationships were found between the PKTA and the established EF assessments. Therefore, the findings do not support the validity of the PKTA as an EF assessment for preschools. However, results show that the scores of the PKTA appear to be sensitive to age and that it may be a useful ecologically valid performance-based assessment of preschool skills.

The lack of relationship between the PKTA and the established neuropsychological is a surprising result as the steps in the PKTA have face validity as an EF assessment. Steps require initiation, planning and organization, shifting and inhibition. A key factor may have been the power of the study due to the small sample size used in the study. Several modest correlations were found between PKTA scores and the other assessments but were not significant. For example, the PKTA scores modestly correlated with Backwards Digit Span and the Shifting Clinical Scale and Flexibility Index on the BRIEF-P. Further, aspect of EF tapped in a performance-based assessment may be different than those measured in neuropsychological assessments. Another contributing factor that may have compromised the results may have been due to the number of researchers in the study. Within the two years of the study, six researchers assessed and collected data. Reliability of administration of the measures between all researchers were not done at the same time, therefore this may have also affected the results of the study.

As PKTA is sensitive to age, researchers believe that various developmental milestones such as fine motor, sensory processing, and visual perception can be observed in preschoolers

with the PKTA task. Cutting with scissors, opening the cap of glue, utilizing a tripod grasp when drawing with crayons are examples of fine motor skills that can be examined with the completion of the PKTA. Visual perception skills, such as identifying and discriminating the colors of the caterpillar's body, as well as replicating the caterpillar picture from the model in the recipe book are skills that can be assessed by OTs. In addition, eye hand coordination skills such as manipulation of the materials and the completion of each step project can be observed with the PKTA. This assessment provides OTs with the opportunity to observe and examine a variety of developmental skills in young children. Although the PKTA may not be a valid tool in assessing EF, researchers believe that the PKTA is an ecologically valid measure of preschool skills because the project is engaging and greatly parallels with age appropriate arts and crafts activities children complete while in a natural preschool setting. Thus, the PKTA may potentially be a better developmental test than as an EF test.

Limitations and Future Recommendations

Researchers considered various potential limitations in this study. One major limitation that could have influenced the study was the small sample size of 24 participants. The small sample reduced the power of the study to find significance in the correlations among measures. A small sample of pre-school children from one county also limits the generalizability of the results. For future studies, the researcher should consider including a larger sample size. Another limitation noted by the researchers was that the participants were recruited from three different preschools; therefore they were assessed in three different classroom environments. The participants were also tested in different days of the week and hours of the day. The researchers consider that some children's energy level and attention span during the assessment

process may have been influenced by the hour of the day in which they were assessed, consequently affecting their performance during testing.

Besides the limitations mentioned above, the researchers considered that the children assessed during one first phase of the study received fewer verbal instructions on how to use the 'recipe book' to complete the PKTA task, compared to children who were assessed in the subsequent phases of the study. Furthermore, the term 'recipe book' could have been confusing for the participants because the PKTA task did not involve a cooking recipe or a cooking task. The researchers recommend that the 'recipe book' be referred as 'instruction book' or ' picture book' in future studies.

Implications for Occupational Therapy

EF skills are crucial building blocks for successful achievement in school, social, emotional, as well as moral development (CDCHU, 2011). However, children who have impaired EF and do not have opportunities to strengthen EF skill may encounter negative challenges across their lifespan (Cramm et al., 2013) particularly in academic performance and social participation. OTs role is to promote healthy development and participation of occupations in children across different contexts. Assessing children for EF deficits may allow OTs to help counteract occupational barriers due to EF dysfunction. OT goals are to create an individualized treatment plan for the child so that the child may lead a productive and independent life.

The PKTA involves the completion of an art and craft project, similar to the ones children engage and complete while in preschools; thus making the activity ecologically valid. With further research, the PKTA may be utilized to screen children with potential occupational barriers due to EF deficits. In addition, the PKTA could be a helpful tool for pediatric and

school based OTs to observe various developmental skills in young children. Among other assessment tools, the PKTA may offer OTs essential information about the child's needs and deficit target areas for intervention. By acquiring an in-depth understanding of the child, OTs may create and deliver effective intervention plans, provide opportunities for success, and ultimately enhance the child's quality of life and well being.

Conclusion

EF is vitally important in the healthy development of preschoolers because it supports full participation in many areas of occupation and helps predict future academic success in older children (Beer et al., 2014). Therefore, early detection of EF deficits in young children can be beneficial in the prevention and intervention for potential functional deficits that may affect children's occupational performance across different contexts. Using ecological assessments when measuring EF in children is extremely important to allow more accurate generalization of the evaluation of data to real world functioning. In addition, the use of appropriate ecologically valid tools of EF while evaluating children is necessary to be able to effectively address the children's deficits through meaningful individualized interventions. As previous studies suggest, early intervention can support the acquisition, development, and improvement of EF in children (Cramm et al., 2003). Researchers of this study consider that the PKTA may be an ecological and useful developmental tool that allows direct observation of important skills in preschool children. Ultimately, the results from the PKTA may be able to help create interventions that can promote school readiness, successful engagement in activities of daily living, instrumental activities of daily living, leisure, and play occupations in the children assessed.

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Appendix A - Consent Form - Parent Form

CONSENT FORM TO ACT AS A RESEARCH PARTICIPANT
DOMINICAN UNIVERSITY OF CALIFORNIA
Preschool Kitchen Task Assessment Study

Purpose and Background of the Study:

Angelica Soltis, Christine Kim and Jana Goodman, graduate students and their faculty advisor Dr. Julia Wilbarger from Department of Occupational Therapy at Dominican University of California, are conducting a research study designed to look at the validity of a new assessment of thinking and problem solving skills in young children: The Preschool Kitchen Task Assessment.

The purpose of this research is to examine how accurately the Preschool Kitchen Task Assessment (PKTA) measures a child's ability to initiate, organize, plan, and sequence a craft activity. Scores on the PKTA record the level of assistance the child needs to complete a simple craft activity. Children's scores on the PKTA will be compared to their scores on the Parent Behavior Rating Inventory for Executive Function (P-BRIEF), the Dimensional Change Card Sort (DCCS) (sorting task) and a Digit Span Task (memory task). All are established tool for assessing thinking and problem solving skills (executive functions) in children. Parent's role in this study is to provide information about their child's past and current developmental, medical, and behavioral history.

I am being asked to participate in this study because I am a parent of a typically developing 3 to 5 year old child

Procedures:

If I agree to be a participant in this study, the following will happen:

1. I will be asked to complete a background information questionnaire about my child's developmental and medical history, my education and current occupation. It will take about 10 minutes to complete this form.
2. I will complete the Behavior Rating Inventory of Executive Function (P-BRIEF), which asks questions about my child's behaviors in areas such as attention and self-control. It will take about 20 minutes to complete this form. I am encouraged to answer all of the questions, but may omit any items that I do not want to answer.

Risks and/or Discomforts:

1. I understand that my participation involves minimal to no physical risk, but may involve some psychological discomfort completing the Parent BRIEF which asks about a child's behavior problems.
2. I may decline to answer any question that seems to be too personal in nature, causes me distress or seems an invasion of my privacy. I may elect to stop participating before or after the study is started without any adverse effects.
3. Study records will be kept as confidential as possible. No individual identities will be used in any reports or publications resulting from the study. All personal references and identifying information will be eliminated when the data are recorded, and all participants will be identified by numerical code only, thereby assuring confidentiality regarding the participant's results. The master list for these codes will be kept by the researchers in a

locked file separate from other records. Only the researchers, their faculty adviser, and research assistants will see the data.

One year after the completion of the research, all written and recorded materials will be destroyed.

Benefits:
There will be no direct benefit to me from participating in this study. The anticipated benefit of this study is to begin validating the PKTA, a potentially useful tool for assessing thinking skills in young children.

Costs/Financial Considerations:
There will be no cost to me or my child as a result of taking part in this study.

Payment/Reimbursement:
Neither my child no I will be reimbursed for participation in this study.

Questions:
I have talked to the student researchers about this study and have had my questions answered. If I have further questions about the study, I may contact them at pkta2015@gmail.com or their research supervisor, Julia Wilbarger, PhD, OTR/L, Occupational Therapy Department, Dominican University of California, (415) 257-0125.

If I have any questions or comments about participation in this study, I should talk first with the research team and the research supervisor. If for some reason I do not wish to do this, I may contact the Dominican University of California Institutional Review Board for the Protection of Human Subjects (IRBPHS), which is concerned with the protection of volunteers in research projects. I may reach the IRBPHS Office by calling (415) 482-3547 and leaving a voicemail message, by FAX at (415) 257-0165 or by writing to the IRBPHS, Office of the Associate Vice President for Academic Affairs, Dominican University of California, 50 Acacia Avenue, San Rafael, CA 94901.

Consent:
I have been given a copy of this consent form, signed and dated, to keep.

PARTICIPATION IN RESEARCH IS VOLUNTARY. I am free to decline to be in this study or withdraw my participation at any time without fear of adverse consequences. My decision to participate or not will not affect my child's participation in their preschool program.

My signature below indicates that I agree to participate in this study.

_____ _____

Participant's Signature **Date**

_____

Researcher's Signature **Date**

Appendix B - Proxy - Consent Form

PROXY CONSENT FORM FOR RESEARCH PARTICIPATION
DOMINICAN UNIVERSITY of CALIFORNIA
Preschool Kitchen Task Assessment Study

Purpose and Background of the Study:

Emily Fry, Hayley Gilligan, Liza Henty-Clark, and Jennifer Weissensee, graduate students and their faculty advisor Dr. Julia Wilbarger from Department of Occupational Therapy at Dominican University of California, are conducting a research study designed to look at the validity of a new assessment of thinking and problem solving skills in young children: The Preschool Kitchen Task Assessment.

The purpose of this research is to examine how accurately the Preschool Kitchen Task Assessment (PKTA) measures a child's ability to initiate, organize, plan, and sequence a craft activity. Scores on the PKTA record the level of assistance the child needs to complete a simple craft activity. Children's scores on the PKTA will be compared to their scores on the Parent Behavior Rating Inventory for Executive Function (P-BRIEF), the Dimensional Change Card Sort (DCCS) (sorting task) and a Digit Span Task (memory task). All are established tool for assessing thinking and problem solving skills (executive functions) in children. Parent's role in this study is to provide information about their child's past and current developmental, medical, and behavioral history.

I am being asked to participate in this study because I am a parent of a typically developing 3 to 5 year old child

Procedures:

If I agree to allow my child to participate in this study, the following will happen:

1. My child will be observed completing the PKTA. During this task my child will follow step by step instructions in a picture book to make a caterpillar picture. This task will take approximately 10 to 20 minutes to complete.
2. My child will participate in the Dimensional Change Card Sort Task. During this test, the child will be asked to sort cards according to color or shape. This test takes approximately 5 minutes to complete.
3. My child will participate in a Digit Span Task for young children. My child will repeat a simple series of numbers forwards and backwards from memory.
4. My child will be video recorded during the tasks.
5. My child will participate in this project in a quiet area of her/his preschool during a scheduled time during their preschool day.

Risks and/or Discomforts:

1. My child may find some of the tasks challenging and become frustrated during the assessment period. If this happens, the researchers will attempt to comfort my child. If my child continues to be frustrated, the researchers will return my child to his regular preschool activities.
2. Study records will be kept as confidential as possible. No individual identities or images will be used in any reports or publications resulting from the study. All personal references and identifying information will be eliminated when the data (including video) are recorded,

and all participants will be identified by numerical code only, thereby assuring confidentiality regarding the participant's results. The master list for these codes will be kept by the researchers in a locked file separate from other records. Only the researchers, their faculty adviser, and research assistants will see the data.

One year after the completion of the research, all written and recorded (including video) materials will be destroyed.

Benefits:
There will be no direct benefit to me from participating in this study. The anticipated benefit of this study is to begin validating the PKTA, a potentially useful tool for assessing thinking skills in young children.

Costs/Financial Considerations:
There will be no cost to me or my child as a result of taking part in this study.

Payment/Reimbursement:
Neither my child no I will be reimbursed for participation in this study.

Questions:
I have talked to the student researchers about this study and have had my questions answered. If I have further questions about the study, I may contact them at PKTAthesis@gmail.com or their research supervisor, Julia Wilbarger, PhD, OTR/L, Occupational Therapy Department, Dominican University of California, (415) 257-0125.

If I have any questions or comments about participation in this study, I should talk first with the research team and the research supervisor. If for some reason I do not wish to do this, I may contact the Dominican University of California Institutional Review Board for the Protection of Human Subjects (IRBPHS), which is concerned with the protection of volunteers in research projects. I may reach the IRBPHS Office by calling (415) 482-3547 and leaving a voicemail message, by FAX at (415) 257-0165 or by writing to the IRBPHS, Office of the Associate Vice President for Academic Affairs, Dominican University of California, 50 Acacia Avenue, San Rafael, CA 94901.

Consent:
I have been given a copy of this consent form, signed and dated, to keep.

PARTICIPATION IN RESEARCH IS VOLUNTARY. I am free to decline to have my child participate in this study or to withdraw my child from this study at any point. My decision as to whether or not to have my child participate in this study will have no influence on my child.

My signature below indicates that I agree to allow my child to participate in this study.

_____ _____

Subject's Signature **Date**

I also consent for my child to be video recorded

Subject's Signature **Date**

Researcher's Signature **Date**

Appendix C - Background Questionnaire

BACKGROUND QUESTIONNAIRE

Date: _____ **ID # _____**

Age of child:_____ Grade in School:_____

Relationship to participant of person completing this form:
_____

Child's Ethnic Background: (Check One)

- □ American Indian or Alaskan Native
- □ Asian or Pacific Islander
- □ Black, not Hispanic
- □ Hispanic
- □ White, not Hispanic
- □ Other or unknown

BIRTH HISTORY

Any complications or difficulties prior to or during birth of the child: Prematurity, fetal distress, long labor, caesarian birth, oxygen required, prolonged hospitalization, injuries or birth defects?

DEVELOPMENTAL MILESTONES

Did the participant achieve the following milestones more or less on time (typically), or were they delayed? Recall to the best of your ability.

	Age when child first:
Smiled	
Made eye contact	
Walked	
Colored or drew	
Said first word	
Spoke in phrases	
Caught a ball	
Rode a bike	
Read words	
Wrote name	

MEDICAL HISTORY

Please list all medication taken during the last month:

Please describe any chronic or reoccurring illnesses:

Does the child have a history of any of the following? (circle Yes or No)

		If yes, please describe
Allergies (Food or other)	YES NO	
Vision or hearing problems	YES NO	
Physical limitations	YES NO	
Learning or Developmental disorder	YES NO	
Head injury/ loss of consciousness	YES NO	
Seizures or Neurological difficulties	YES NO	
Participation in Special Education	YES NO	

FAMILY/LIVING SITUATION

Who does the child live with?

How many people live in the child's home?

How many people contribute to the child's daily care?

Mother/Caregiver
Occupation _____

Highest level of education (Check One)

- □ Less than 7th grade
- □ Completed 8th or 9th grade
- □ Completed 10th or 11th grade
- □ Graduated from high school
- □ Some college or specialized training
- □ Graduated from four year college or university
- □ Has graduate degree

Father/ Caregiver
Occupation _____

Highest level of education (Check One)

- □ Less than 7th grade
- □ Completed 8th or 9th grade
- □ Completed 10th or 11th grade
- □ Graduated from high school
- □ Some college or specialized training
- □ Graduated from four year college or university
- □ Has graduate degree