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Factors influencing engagement in a messy craft occupation in young children:

choice, gender, and sensory processing

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May 2010
Abstract

Participating in messy crafts is a common childhood occupation, performed in numerous settings including school, child care, clubs, and home. We explored factors which affect engagement in a messy craft. The primary hypothesis we tested was that giving participants craft materials in the color of their choice would motivate them toward higher engagement in the occupation, compared to participants not given their choice of color. We also examined the effects of gender and of sensory processing patterns, as measured by caregiver report on the Sensory Profile (Dunn, 1997). We further tested for interactions between these personal characteristics and the experimental condition (Choice, No Choice). Twenty-five typically developing children aged five to six years old were recruited and given the opportunity to participate in a messy craft. Participants were randomly assigned to the Choice or No-Choice condition. The Child Behavior Rating Scale (CBRS, Mahoney, 1998) was used to rate engagement in the occupation. Results indicated that providing choice did not enhance engagement as predicted. However, important findings did surface: (1) girls showed a higher level of engagement in the occupation compared to boys, regardless of condition; (2) children with lower thresholds for sensory processing demonstrated lower engagement in the occupation, regardless of condition; and (3) there was an interaction between sensory seeking behaviors and the experimental condition that enhanced engagement when choice was provided. Findings suggest that with a better understanding of sensory processing patterns and play preferences, child care providers, child educators, families, and therapists can plan activities to enhance engagement in occupations of childhood.
Since the turn of the 20th century, the topic of motivation has drawn much attention from researchers. Occupational therapists must take into account the factors that influence motivation when assessing occupational performance and planning therapeutic occupations. Engagement, the degree to which an individual becomes meaningfully involved in an occupation, is one observable measure of motivation. This study explored factors which influenced engagement in a messy craft occupation in young, school-aged children.

The desire to engage in a behavior is defined by two types of motivation: intrinsic and extrinsic motivation (Deci & Ryan, 1985). Deci and Ryan defined intrinsic motivation as the desire to engage in a behavior for which the rewards are internal to the person. For example, a child might kick a ball into the air just to see what will happen next. In contrast, extrinsic motivation is defined as a desire to perform a certain behavior to receive some external reward. For example, a person might dislike preparing for a football game but seek the praise that will come later from his teammates. While many studies have focused on observable behavior, the study of motivation is thought to be the investigation into the underlying mechanisms leading to engagement in behavior (Deci & Ryan, 2000).

**Reward**

In the cognitive evaluation theory, Deci and Ryan (1985) suggested that the effects of contingent performance rewards are detrimental on intrinsically motivated behavior. The theory suggests that a shift from intrinsic to extrinsic motivation is facilitated by underlying external factors which cause a change in perceived locus of causality (Heider, 1958; deCharms, 1968; Deci & Ryan, 1985). An individual is said to have an external locus of causality when he or she feels that his or her behavior is controlled by some event. In contrast, an internal locus of causality is evident when an individual feels that he or she is engaging in a behavior freely with
no sense of coercion. As such, during the shift from intrinsically motivated behavior to behavior undertaken to receive an external reward there is a simultaneous shift in the perceived locus of causality from internal to external.

In the early 1970’s, Deci (1971) examined the effect of extrinsic incentives on participants intrinsic interest in activities for which extrinsic incentives had been previously available, but no longer were. Undergraduate students were offered a one-dollar incentive for every three-dimensional manipulative puzzle they could correctly complete. Later, the researcher secretly observed the amount of time these students chose to spend continuing to work on the activity after the experimenter had left the laboratory and there was no longer any incentive for further engagement. When compared with the control group of students who had not received any payment for the same work, students in the extrinsic incentive condition chose to spend less time with the puzzles once the reward had been removed. The results of this study suggest that the effect of external rewards is to decrease intrinsic motivation.

**Choice**

In addition to the presence of rewards or constraints on motivation, choice is another factor that may affect an individual’s perceived locus of control and his or her motivation to engage. Zuckerman et al. (1978) hypothesized that the presence of choice should cause the locus of causality to shift internally rather than externally. In this study, investigators first matched pairs of subjects to work on puzzle activities together. One person from each matched pair selected three of six puzzles that he or she wanted to work with, while the other subject was assigned to work on the same three puzzles chosen by his or her partner. Each subject completed the puzzles independently so that he or she did not know about his or her partner’s condition. The results of this study indicated that individuals who had a choice of which puzzles to complete spent more
time involved with the puzzles than those subjects who had worked on the same puzzles without having choice. The findings of this study indicate that choice may cause the perceived locus of causality to become more internal and lead to more intrinsic motivation.

A study conducted by Rice and Nelson (1988) examined the effects of offering choice in occupational therapy with adult males diagnosed with mental disabilities. Each subject was given a choice of five wrinkled T-shirts with logos on them and was told to choose one to iron before they took it home. Subjects also participated in control sessions in which they were not given a choice between the five wrinkled T-shirts. Motivation was determined by measuring the amount of water that had evaporated out of the iron during the occupation (a proxy measurement for engagement). In the choice condition, significantly more water was evaporated from the iron indicating that having a choice in an occupation can be a significant motivator of increased participation.

Lamore and Nelson (1993) also examined the performance of adults with mental disabilities in an art occupation. The adolescents were paired, and one adolescent from each pair was allowed to choose a plaster object to paint, while the second member of the pair was instructed to paint the same object that his or her partner had chosen. Both participants were unaware of what their partner was painting. Following a three day to one week rest, the roles were reversed. Participation was measured based on the number of times participants dipped the paintbrush into the paint and the time spent painting. The researchers found a significant increase in repetitions in 22 adult subjects indicating that when choice is provided, engagement increases.

In a similar study, Schroeder Oxer and Kopp Miller (2001) examined the effects of choice on occupational engagement with adolescents diagnosed with psychiatric conditions. The adolescents were paired as in the study of Lamore and Nelson (1993). One randomly selected
adolescent from each pair was given a choice of which object to paint while the second adolescent was not. Following a one week rest period, the roles were reversed. The researchers found that adolescents applied more paint when given a choice. This study provides further support that when given the opportunity for choice, occupational performance can improve.

McNairy (1985) examined the potential benefits of choice-making in children in field observations in a preschool classroom. Her findings suggested that children are more cooperative and more engaged when given choice-making opportunities. Moreover, providing choice decreased acting out behavior, aggression, and disruptions while increasing engagement. The results of this study indicate that providing choice enhances opportunities for learning and assists in the development of positive behaviors.

**Sensory Processing Disorder and Behavioral Patterns**

Another factor that may influence intrinsic motivation to engage in a task is sensory processing. Sensory processing is the method by which the brain registers, organizes, and responds to stimuli (Ayers, 1972). The senses function to provide the information we need for surviving, maintaining safety, planning and carrying out actions, learning (adaptive learning, motor learning, and academic learning), and deriving satisfaction from events. Sensory processing varies between individuals; therefore, perceptual experiences of sensory stimuli would be expected to influence intrinsic motivation according to an individual’s sensory processing pattern.

Sensory Processing Disorder (SPD) refers to a collection of disorders in which it appears that the brain has diminished abilities to organize and regulate responses to sensory information in order to function in daily life (Ayers, 1972; Royeen & Lane, 1991; Parham & Mailloux, 1996; Miller, Anzalone, Lane, Cermak, & Osten 2007). Disruptions in the central nervous system in
how an individual processes sensory input can affect the way he or she plays, makes friends, feels about him/herself, and behaves, subsequently affecting intrinsic motivation to engage in tasks.

Sensory Modulation Disorder (SMD), the most common subgroup of sensory processing disorder, is a dysregulation of the central nervous system’s ability to respond appropriately to the intensity, frequency, or duration of sensory stimuli (Miller, et al. 2007). When modulation is intact, behavioral responses to stimuli reflect an optimal balance between inhibition and excitation such that they allow an individual to respond to the stimuli in a manner that matches the attributes of the stimuli such as intensity and valence (i.e. threatening or not). However, when the nervous system has a problem with modulation, responses do not match the characteristics of the stimuli.

Dunn’s model of sensory processing (1997) evolved from literature and data gathered from more than a thousand children with and without disabilities during development of an assessment instrument, the Sensory Profile. The model describes an interaction between neuroscience and behavioral concepts that affect a person’s behavior and performance in everyday activities. It proposes that an interaction of two continua, “threshold” and “self-regulation” gives rise to the patterns with which people respond and react to sensory events. Sensory modulation disorders result when sensory processing patterns disrupt everyday life, when there is a mismatch between an individual’s sensory processing pattern and his or her environment, or when an individual does not demonstrate a consistent sensory processing pattern.

The neurological threshold continuum is responsible for regulating patterns of information through a continuous interchange between habituation and sensitization known as thresholds.
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(Dunn, 1997). A threshold refers to the amount of input required to cause the nervous system to respond (Dunn, 2007).

According to Dunn’s model (1997), an individual with sensory underresponsivity requires many or intense stimuli to reach very high neurological thresholds to elicit a behavioral response. As a result, individuals who are underresponsive tend to not respond, or respond slowly to external stimuli of typical intensity. In keeping, they have high thresholds for pain and temperature, such that dangers accompany their everyday activities and occupations. They may not feel pain appropriately and ignore a bleeding cut or a bump on the head because they do not register painful sensations (Miller, et al., 2007).

At the other end of the continuum for neurological threshold is overresponsivity, resulting from lower thresholds which require very little stimuli to activate the neurological mechanisms needed for a behavioral response. This is the most common type of SMD (Schaaf, 2001), often referred to as sensory defensiveness. Overresponsivity to stimuli can occur in a single sensory system (e.g. tactile defensiveness and auditory defensiveness) or multiple sensory systems. It may be the case that the nervous systems of individuals who have overresponsivity cannot filter sensations in a way that would allow them to generate an appropriate response (Dunn, 1999; Miller, et al., 2007). Symptoms of sensory overresponsivity include low tolerance for pain, overly sensitive to smells, over-stimulated by loud sound, or respond aggressively to touch.

The second continuum, self-regulation, represents the range of behavioral strategies a person uses to respond to sensory input (Dunn, 1997; Dunn, Saiter, & Rinner, 2002; Dunn & Daniels, 2002). At one end of the continuum is a passive self-regulation strategy. A person with a passive responding strategy fails to react to environmental and sensory events despite discomfort. He/she would also not seek out specific sensory experiences. At the opposite end of the continuum is an
active self-regulation strategy. Persons who utilize an active responding strategy engage in behaviors to regulate sensory input that supports their ability to function. The interaction of these two continua gives rise to four patterns of sensory processing.

A Low Registration (high threshold/passive approach, Quadrant 1) pattern of sensory processing refers to difficulty registering stimuli in the internal and external environment and a lack of behaviors aimed at garnering sensory stimulation (Dunn, 1997). In Dunn’s model, she described individuals with poor registration as withdrawn or uninterested who are difficult to engage. Because of their high neurological thresholds, they fail to notice stimuli (Dunn, 1997, 2007), need additional cues to interact (Dunn, 2001; Dunn & Daniels, 2002; Dunn, Saiter, Rinner, 2002), and may engage in repetitive play to increase their contextual experiences (NCCIP, 1994). As a result, persons with low registration may require a sufficient amount of externally supplied input to meet his or her neurological demands for daily activities.

An individual with Sensation-Seeking (high threshold/active approach, Quadrant 2) behaviors craves stimulation from the environment engaging in sensory experiences that feed their high neurological demands (Dunn, 1997; Dunn & Daniels, 2002). Individuals who demonstrate sensation seeking patterns vigorously seek out (i.e., active self-regulation strategy) sensations in daily experiences (Dunn, 1997, 2007; Dunn, Saiter, Rinner, 2002) and never seem to get enough. The sensory seeker thrives on creating experiences that increase sensory input (Dunn, 2007). For example, a child with oral seeking behaviors may excessively lick, taste, or chew on inedible objects. Characteristic of sensory seekers is their need for one type of sensation (e.g., visual), with little consideration for others (Kranowitz, 2005).

Persons with Sensory Sensitivity (low threshold/passive approach, Quadrant 3) patterns are characterized by their low sensory thresholds and tend to notice stimuli and sensory events more
frequently than others (Dunn, 1997, 2001, 2007). Individuals with sensory sensitivity react to sensory input as it occurs (Dunn, 2007). For example, a child with auditory sensitivity may react to loud noises (e.g., fireworks) by screaming or crying but not actively avoiding them. Dunn and colleagues described children with sensitivity as being complainers, short-tempered, and demanding.

The Sensation-Avoider (low threshold/active approach, Quadrant 4) is characterized by the inability to inhibit sensations efficiently resulting in circumvent behaviors that limit sensory input (Dunn, 1997). Their low sensory thresholds suggest that the nervous system is easily overloaded with little input (Dunn, 2007). However possible, sensation avoiders actively seek to reduce sensory input that is over-stimulating or threatening (Dunn, 1997, 2001). For example, an adult with tactile defensiveness may avoid social events for fear of the unexpected touch despite enjoyment in these activities. Consequently, sensation avoiding behaviors can interfere with daily activities that disrupt everyday life.

**Sensory Processing Disorder and Occupational Performance**

Dunn’s model (1997) provides a framework for understanding patterns of behavior and developing methods for addressing children’s sensory processing needs in a functional and supportive manner. Bundy, Shia, Qi, and Miller (2007) examined how SPD affects play in children age four to ten. Two videotaped segments of free play were assessed for each of the twenty participants. The play sessions occurred in a clinic that was equipped with sensory integration-based activities and toys. Rating the sessions using Bundy’s Test of Playfulness, the authors concluded that sensory modulation disorder decreases playfulness. Similarly, a case study conducted by Dahl Reeves (1998) described how a six year-old child with SMD had difficulty engaging in occupations. Observations during two sessions revealed that the child’s
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sensitivity to stimuli was contributing to difficulty in fine-motor occupations and interfered with his ability to manipulate objects.

Here, we explored the therapeutic benefit of providing choice of materials on engagement in a messy craft occupation. To increase our understanding of the effects of sensory modulation on occupational performance, we assessed engagement of participants with differing sensory processing patterns. Finally, we tested whether the effect of choice is different depending on sensory processing patterns in typically developing children.

Methodology

Participants

Twenty-five children, recruited from three after school programs, participated in the study. The age of the children ranged from five to six years old with a mean age of 5.64 (SD = 0.5). There were seven girls and eighteen boys. The ages of girls and boys were not different (5.7±0.5 years and 5.6±0.5 years for girls and boys respectively, p>0.05 in an unpaired t-test). We also recruited children identified as having a sensory processing disorder from local therapy clinics. However, because we restricted participation to children without other major diagnoses, no referrals were made to the study. As reported below, we utilized the Sensory Profile (Dunn, 1999) as a measure of sensory processing patterns. It is interesting to note that many of the typically developing children in this study had scores outside of the normative range. Of the 20 participants whose parents completed the assessment, 13 had scores at least one standard deviation from the mean in one or more of the sensory processing pattern quadrants.

Data were collected in small, quiet rooms at after school program facilities. All guardians gave informed consent for child participation and children gave verbal assent to participate. All
participating families were given an incentive following participation. Procedures were approved by the biomedical Institutional Review Board of the University of Toledo.

**Sensory Profile**

Each guardian was asked and encouraged to complete the caregiver questionnaire of the Sensory Profile (Dunn, 1999) to obtain a measure of sensory processing patterns. The questionnaire contains 125 items that describe a child’s response to sensory experiences. The guardian rates the frequency with which the child demonstrates each response ranging from “almost always” to “almost never.” The psychometric properties (consistency, reliability, and validity) of the Sensory Profile are adequate to good as established through studies done by the author (Dunn, 1999). Each of the items, as determined by factor analysis (Dunn, 1999), reflects a behavior typical of one of the quadrants of sensory processing patterns ((1) Sensory Registration, (2) Sensory Seeking, (3) Sensory Sensitivity, (4) Sensory Avoiding); therefore, participants’ scores could be compared to the normative data for each quadrant. Amongst the 20 participants whose guardians completed the Sensory Profile, seven had Sensory Profile scores in the typical range in all four quadrants. The remaining 13 participants had scores in the Probable or Definite Difference range in at least one of the four quadrants. Amongst children with only probable differences (n=11), five had only one quadrant with probable difference; two had two quadrants with probable difference; and four had three quadrants with probable differences. Amongst children with any definite differences (n=3), two had a definite difference in one quadrant and a probable difference in one other quadrant and two had definite differences in three quadrants and a probable difference in the remaining quadrant. See Table 1 for distribution of scores on the Sensory Profile in the study participants.
Procedure

Each participant was given an opportunity to participate in a messy craft occupation—paper maché. Materials used in paper maché included a colored balloon, corn starch, water, and strips of colored paper. In preparation, the researcher stirred three parts water into one part corn starch until a smooth and creamy mixture (paste) resulted. Participants could dip the strips of paper in the paste and apply them to the balloon, covering its surface such that when it dried, it had solid surfaces with varied texture. Before beginning the occupation, the participant was given the option to don a protective smock to prevent his or her clothes from getting dirty. A video camera was used to record each session to ensure adequate capture of participation for offline rating.

The twenty-five participants were randomly assigned to either the control group or the experimental group. The experimental group (Choice, n=13) was given choice for the color of the balloon and paper strips. In the control group (No Choice, n=12), the colors of these materials were randomly assigned. As the ability to discriminate the full spectrum of color likely impacts an individual’s preference for color, participants were screened for intact color vision using the Colour Vision Test Plates for Infants (Kojima & Matsubura, 1957). All participants met passing criteria.

Before the occupation began, the participant was shown the array of colors of paper and balloons which could be used in the paper maché craft. After the color selection had been made or given, the researcher removed the remaining colors and blew the balloon up. The researcher described the occupation of paper maché to each participant, indicating the materials involved (see instructions below). Before the occupation began, each participant was told to “do paper maché as little or as much as you want too.” The occupation started once the child started dipping the paper into the pre-mixed material and ended when the child said he or she was
finished or, after 2-minutes of disengagement, the participant was asked if he or she was finished. The participant was not coerced or encouraged to participate. During the occupation, the researcher was seated at the table with the participant. To reduce the possibility that participants were extrinsically motivated to produce a good paper maché product to please their parents or guardians, finished paper maché projects remained at the facility for at least a week before participants could retrieve them.

**Instructions for the experimental group**

The following script was used to introduce the occupation in the experimental group.

“Here are the different colors of paper and balloons you can use for paper maché (blue, red, yellow, green, and orange). You can choose one color of paper and one balloon to use. The water and towels are there for you to clean your hands if you like. Dip each strip of paper into the paste and put it on the balloon. Would you like me to show you how? You will have as much time as you need to complete this project or let me know when you feel that you are done. Once you are finished, you will leave your project here to dry. You can come back to get it next week if you’d like. Do you have any questions?”

**Instructions for the control group**

The following script was used to introduce the occupation in the control group.

“Here are the paper and balloon you can use for paper maché. Here is the type of colored paper and balloon you will be using (blue, red, yellow, green, and orange). The water and towels are there for you to clean your hands if you like. Dip each strip of paper into the paste and put it on the balloon. Would you like me to show you how? You will have as much time as you need to complete this project or let me know when you feel
that you are done. Once you are finished, you will leave your project here to dry. You can come back to get it next week if you’d like. Do you have any questions?”

After cleaning up, participants were asked to rate how much fun they had using the Fun Scale (Melchert-McKearnan, 2000). See Appendix A. The participant was asked to select which face best represents the amount of fun he or she had during the occupation from a visual analogue scale that ranges from a sad face to a happy face with four faces in between. It was explained that the saddest face indicated “the least fun you’ve ever had” and the happiest face indicated “the most fun you’ve ever had.” In addition, the Child Body Map (Appendix B) was used to record any upper body contact the child made with the paste.

Outcome Measures

The participants’ engagement in the messy craft occupation was quantified in four measures, (a) The Child Behavior Rating Scale (Mahoney, 1998), (b) duration of engagement, (c) The Fun Scale (Melchert-McKearnan, 2000), and (d) contact with the paste.

Child Behavior Rating Scale

To assess the participants’ engagement in this occupation, the Child Behavior Rating Scale (CBRS; Mahoney, 1998) was utilized. The CBRS is used to rate observations of a child’s behavior and consists of seven items: Attention, Persistence, Involvement, Cooperation, Initiation, Joint Attention, and Affect. Trained observers rate a child’s behavior on each item on a 5-point Likert scale ranging from 1 (very low) to 5 (very high). Mahoney and Perales (2005) used the CBRS to test the effectiveness of teaching parents to use specific techniques for interacting with their children. In a baseline session, they videotaped children and their parents while playing together as they usually would for seven minutes. The parents were then trained in the interaction technique hypothesized to improve child engagement. In subsequent sessions,
trained observers gave higher ratings for all seven CBRS items. This suggests that the CBRS is sensitive to changes in children’s behaviors.

For the present study, the CBRS was modified according to the recommendations of the author (G. Mahoney, personal communication, October 17, 2008) by tailoring the individual items to the range of behaviors observed in the study (Appendix C). The adapted CBRS utilized five of the seven child engagement items. These were as follows:

1. **Attention**: The extent to which the child attends to the occupation.
2. **Persistence**: The degree to which the child makes an effort to participate in the occupation.
3. **Involvement**: The level of intensity with which the child is involved in the occupation.
4. **Joint Attention**: The extent to which the child initiates interaction with the adult.
5. **Affect**: The child’s general emotional state during the occupation.

Cooperation and Initiation were excluded because they measure compliance with requests (not applicable in our aim to study intrinsically motivated behaviors) and initiation of multiple occupations (where we introduced only a single task), respectively. CBRS scores were assigned to the entire session. In addition, scored increments of 10% at the beginning, middle, and end of each session were recorded. Total CBRS scores were derived from the sum of items.

**Duration, fun, and contact with craft material**

Duration of engagement was timed with a stopwatch from the time the participant started dipping the paper for use in paper maché until the time he or she finished, as described above. The participants’ ratings of enjoyment using the Fun Scale were converted to scores of 0 to 5. To obtain a measure of contact with the paste, the Child Body Map data was scored as follows: 1 for contact with fingers only (one or both hands), 2 for contact with fingers and palms (one or
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both hands), 3 for contact with fingers, palms, and wrists (one or both hands), and 4 for contact with fingers, palm, wrist, and proximal forearm (one or both hands).

**Data analysis**

Data were assessed for normal distribution (kurtosis and skew) and found to be sufficiently normal to allow parametric testing. To assess for validity of our outcome measures, correlation analysis was performed. We utilized Multivariate Analysis of Variance (MANOVA) to compare outcome measures. Comparisons were made across the two conditions (experimental, “Choice” and control, “No Choice”) and gender. To take into account sensory processing patterns, we also compared participants with scores in normative range (within one standard deviation of the mean, “Typical”) to participants whose scores fell outside of the normative range (grouping those whose scores fell between one and two standard deviations from the mean (Probable Difference) and those whose scores fell beyond two standard deviations from the mean (Definite Difference),”Non-Typical”, to allow for robust comparisons in each quadrant of the Sensory Profile). Finally, to test for interactions of the condition (Choice and No Choice) with gender (Male and Female) and with sensory processing (Typical or Non-Typical), we employed Two-Way MANOVA. Significance was set at the α = 0.05 level. Data are reported as mean ± standard error, unless otherwise indicated. The effect size is reported by partial eta-squared (Partial η², Keppel & Wilkins, 2004), representing the proportion of the variation attributable to the factor while excluding other factors.

**Reliability**

A research assistant was trained to 80% agreement within 1 point on the 5-point Likert Scale of the CBRS. The assistant then coded a random 60% of the videotapes. Inter-rater reliability was measured by a linearly weighed kappa statistic which adjusts for chance agreement taking
into account the magnitude of disagreements (Cohen, 1968). The assistant was an occupational therapy doctoral student who was blind to the sensory profile scores and hypothesis of the study to eliminate any bias.

**Results**

The primary outcome measurement of this study is the Child Behavior Rating Scale (CBRS, Mahoney, 1998), used to rate behaviors indicative of engagement in the messy craft occupation. Average CBRS scores on the five item scores, each rated on a 1-5 Likert-type scale where 5 represents very high engagement, were as follows: Attention, 3.9±0.3; Persistence, 3.9±0.2; Involvement, 3.5±0.2; Joint Attention, 3.3±0.3; and Affect, 4.0±0.2. The average CBRS Total score (out of 25) was 18.6±0.9. Other outcome measurements included duration of engagement, enjoyment indicated by Fun Scale Rating, and contact with the paper maché paste. The average amount of time spent engaged in the messy craft occupation was 10.2±1.3 minutes. Using a frequency analysis for the Fun Scale, the number of times each indicator face was chosen to indicate level of fun experienced are as follows: 5 most fun ever had (n = 18), 4 (n = 4), 3 (n = 1), 2 (n = 1), 1 (n = 1), and 0 least fun ever had (n = 0). The average score was 4.5±0.2 on the Fun Scale. In scoring the Child Body Map for contact with the paste, the number of participants who scored in each category are as follows: 1 fingers (n = 20), 2 fingers/palm (n = 4), 3 fingers/palm/wrist (n = 1), and 4 fingers/palm/wrist/proximal wrist (n = 0). The average score derived from the Child Body Map was 1.2±0.1. In assessing for validity of the outcome measures (see Table 2), significant positive correlations were found between items of the CBRS and between the CBRS and duration across all participants in both experimental conditions; however, neither the Fun Scale nor scores of the Child Body Map correlated with other outcome measures.
This suggests that the CBRS has internal validity in measuring engagement, though it appears to represent a construct distinct from fun and contact with the substance.

Comparing measurements of engagement in participants in the Choice (n = 13, 10 boys, 2 girls) and No Choice groups, (n = 12, 8 boys, 4 girls) we found that scores on the CBRS item Attention were lower in the Choice condition, (3.23±0.5 and 4.58±0.2 in the Choice and No Choice condition, respectively, \( F(1, 24) = 6.694, p<0.05, \) partial \( \eta^2 = 0.225 \) a small effect (Keppel & Wickens, 2004)). No other significant differences were detected (see Figure 1). This finding runs contrary to our hypothesis that providing choice of materials would enhance engagement in a messy craft occupation. We therefore further explored the variable Attention. As defined by the CBRS, Attention in the No Choice condition was between High and Very High indicating that participants were rarely distracted from the task at hand. In the Choice condition, Attention averaged at the moderate level where attention to the task was approximately equal to inattention. This suggests that participants in the Choice condition, though they had overall moderate to high engagement scores (mean = 17.1±1.6 out of 25) had less specific attention to the paper maché task. Though there was no difference in the mean scores for other items on the CBRS, we explored whether Attention differed in its relationship to the overall construct of engagement in the two experimental conditions. In the No Choice condition, Attention did not correlate significantly with any of the other CBRS items; however, in the Choice condition, it correlated positively and significantly with Involvement (R= 0.708, \( r^2=0.5, p<0.01 \)), Persistence (R=0.866, \( r^2 = 0.75, p<0.01 \)), and Affect (R=0.735, \( r^2 = 0.54, p<0.01 \)). The relationship with Joint Attention was positive (R=0.545) but not significant.

Interestingly, in the Choice condition, Attention demonstrated a positive correlation with the Fun Scale rating (R=0.752, \( r^2=0.57, p<0.01 \)), a relationship not seen in the No Choice condition nor
in the overall data set, as noted above. No relationship emerged for the Child Body Map. Together, these relationships suggest that in the No Choice condition, Attention reflects a measure of engagement similar to concentration on the task but not necessarily enjoyment or satisfaction in the task as may be surmised in the Choice condition where Attention correlates positively with CBRS items suggestive of enjoyment and satisfaction (Involvement, Persistence, and Affect). Consistent with this, the Fun Scale rating in the Choice condition was higher, though not statistically so, than in the No Choice condition (4.77±0.1 and 4.17±0.4 in the Choice and No Choice condition, p=0.15). Perhaps not having choice of colors for the paper maché task caused the occupation to feel more like work than like play, but the participants still demonstrated the ability to engage productively.

Provision of choice did not enhance engagement across the participants. There were, however, other considerable differences within the sample that warranted exploration. Upon visual inspection of the data, a difference between boys and girls was notable. Statistical tests of significance confirmed this. Female participants demonstrated higher engagement in the messy craft occupation than male participants in several of the outcome measures including Persistence, \(F(1, 24) = 4.456, p<0.05\), Affect \(F(1, 24) = 8.246, p<0.05\), Total CBRS scores, \(F(1, 24) = 5.999, p<0.01\), and Duration \(F(1, 24) = 13.083, p<0.01\). Effect sizes were small (partial \(\eta^2 = 0.162, 0.153, 0.207, \) and 0.363, respectively). See Figure 2. Using a Multivariate Two-Way Analysis, there were no interactions between condition (No Choice, Choice) and gender (Males, Females).

To explore whether there were subtle differences in engagement within this typical sample according to sensory processing patterns, we compared the outcome measurements of engagement in participants with Typical scores on the Sensory Profile to those with Non-Typical
scores (those whose scores were probably or definitely different from the mean of the normative data set) in each of the four quadrants of the Sensory Profile. Five caregivers did not return the Sensory Profile, reducing the number of participants in these analyses to twenty. In Quadrant 3, Sensory Sensitivity, participants with Non-Typical Sensory Profile scores (n=12), compared to participants with Typical scores (n=8) demonstrated less engagement as evidenced by lower CBRS scores for Joint Attention ($F(1, 19) = 5.281, P<0.05$), Affect ($F(1, 19) = 6.464, p<0.05$) and Total scores ($F(1, 19), 1.943, p<0.05$). Effect sizes were small, (Partial $\eta^2 = 0.227, 0.27$ and 0.19 respectively). Similarly, in Quadrant 4, Sensory Avoiding, participants with Non-Typical Sensory Profile scores showed lower Joint Attention ($F(1, 19) = 4.680, p<0.05$). At Partial $\eta^2 = 0.206$ the effect was small. These findings are depicted in Figure 3. There were no significant effects in the remaining quadrants ((1) Sensory Registration and (2) Sensory Seeking).

Having seen lower engagement in participants with Non-Typical Sensory Profile scores, we investigated whether providing choice resulted in enhanced occupational engagement according to sensory profile patterns, which would be in keeping with occupation-based intervention methods. We explored this by testing for interactions between the experimental condition (Choice or No Choice) and Sensory Profile status (Typical or Non-Typical) using Two-way MANOVA. Surprisingly, there were no interactions in quadrants 3 (Sensory Sensitivity) or 4 (Sensory Avoiding) where there had been differences in engagement. Rather, it was revealed that categorization (Typical, Non-Typical) in Quadrant 2, Sensory Seeking, interacted significantly with condition (No Choice, Choice) on outcome measurements of engagement including the CBRS item Affect ($F(1, 19) = 4.836, p<.05$) and the CBRS Total score ($F(1, 19) = 4.761, p<.05$, $n =3, 5, 7, 5$ for Typical/No Choice, Typical/Choice, Non-Typical/No Choice, and Non-Typical/Choice, respectively). With Partial $\eta^2$ at 0.0232 for Affect and 0.0229 for CBRS Total,
effect sizes were minimal. See Figure 4. There were no significant main effects (for condition (Choice, No Choice) or group (Typical, Non-Typical). In both instances, the interaction is such that it appears that providing choice to participants with Non-Typical Sensory Profile scores indicative of sensory seeking had a positive effect on their engagement in a messy craft. In the case of Affect, participants with Non-Typical scores had lower engagement in the No Choice condition than did participants with Typical scores, but in the Choice condition, they were not different from one another. Total CBRS scores were lower in the Choice condition than in the No-Choice condition. This was also seen across all participants (see Figure 1), though the difference was not significant. The difference between No-Choice and Choice was less in participants with Non-Typical scores, accounting for the interaction. When considering these findings together, it appears as if participants participated in the paper maché task similarly whether they had their choice of color of materials or not, but that for participants whose sensory processing pattern includes sensory seeking behaviors, having choice of color reduced the risk of lower engagement.

Interrater reliability for the CBRS was quite good (Landis & Koch, 1977). The linearly weighted kappa statistics for the items Attention, Involvement, and Joint Attention all reflected moderate agreement at 0.79, 0.81, and 0.73, respectively. The Kappa statistic for Persistence and Affect reflected substantial agreement with both at 0.88.

**Discussion**

This study examined whether the choice of colored materials would influence engagement in a messy craft occupation in young school-aged children who are typically developing but had varied sensory processing patterns. We measured engagement with reports of fun, contact with the craft materials, duration of engagement, and five distinct but correlated items of the CBRS:
Attention, Persistence, Involvement, Joint Attention, and Affect. Contrary to our hypothesis, providing choice did not enhance engagement and the only significant difference when comparing engagement between the conditions for all participants was a decrease in Attention in the Choice condition as compared to the No Choice condition. Through examination of correlations amongst the items, it appears that the relationship of Attention to the other aspects of engagement was different when choice was not provided. Though Attention increased in the No Choice condition, it did not correlate with the measures which reflect enjoyment and satisfaction suggesting that the participants perceived the task to be more work-like than fun; however, they worked productively. No further significant differences were found when presented with choice of colored materials, suggesting that allowing typically developing children the choice of colored materials is not critical to their engagement. Most of the participants did indicate, however, their level of enjoyment in the occupation as being, “the most fun ever had,” suggesting that the Fun Scale was not used discriminately by participants. Another possible reason for the lack of significant difference is that the occupation was a significant motivator of engagement, regardless of choice. Nonetheless, within the population, differences in engagement were present that should be taken into consideration for therapeutic planning.

Of the participants in this study, girls showed a higher level of engagement in the paper maché occupation compared to boys, reflecting gender-based play preferences. Fagot and Leve (1998) reported on gender differences in play and found that boys spend more time playing with blocks and transportation toys while girls spent more time playing with dolls, stuffed animals, and art materials. Our result reflects the body of literature that suggests play is intrinsically motivated and children’s desire to engage in craft occupations such as paper maché may be affected by their gender-based interests. Although differences in the play preferences of boys and
Engagement in messy crafts

Girls have been well documented, this finding reminds occupational therapists of the importance of individualized treatment planning.

We also demonstrate that sensory processing patterns influence engagement in a messy craft occupation. A notable finding was that participants with lower thresholds for sensory processing, both those with sensory sensitivity and sensory avoiding behaviors, had lower engagement in the messy craft occupation. One explanation could be that children with sensory sensitivity and avoidant behaviors failed to habituate to the paper maché paste. Perhaps the occupation was novel and messages from sensory receptors received by the nervous system were inconsistent, perceiving benign signals as threatening. Deficits in sensory processing can produce misperceptions and confusion that lead to faulty input from the environment (Smith & Gouze, 2004). Another explanation could be that contact with the paper maché paste became increasingly irritating, thus meeting thresholds and reducing overall engagement. Nonetheless, this finding is consistent with Dunn’s (1997) model of sensory processing of a behavioral response that occurs in accordance with low neurological thresholds.

In addition, analysis for interactions between sensory processing patterns and the provision of choice suggests that participants who displayed sensory seeking behaviors had enhanced engagement when given choice. Perhaps use of their preferred colors contributes to satisfying the need for sensory stimulation, adding meaning and purpose for engaging in the task. Typically, sensation seekers invest more time in sensory events to meet their high neurological thresholds and find ways to extend these experiences (Dunn, 2001). Moreover, they often engage in experiences that are enjoyable and gratifying (Dunn, 2007). This finding must be interpreted with caution as the effect size is small; however, it lends credence to the practice of offering choice of color of materials to children with strong sensory seeking behaviors.
The incidence of Sensory Profile scores indicative of sensory modulation disorders found in our sample compared to proportions observed by others (Brown & Dunn, 2002; Dunn, 1999, 2001). In a national sample of children without disabilities using the Sensory Profile, Dunn and Westman (1996) found comparable results but indicated that children without disabilities can experience moderate or extreme patterns of sensory processing that interfere with behavior. This suggests that everyone has a distinct way of responding to sensory events, with some more or less intense than others.

**CBRS Validity and Reliability**

The results of this research suggest that the CBRS is a reliable and valid measure to assess children’s engagement in a messy craft occupation. It demonstrated internal consistency and the ability to discriminate between productive and joyful engagement. Evidence for internal and face validity was established by correlation scores with duration of engagement. Nevertheless, this study does have limitations in external validity. Demographic information such as ethnicity, socioeconomic status, location, and family size was not collected from the group. Interrater reliability results indicate that observers can use the scale and objectively assess engagement behaviors.

**Support for Dunn’s Model of Sensory Processing**

This study provides support for Dunn’s Model of Sensory Processing. Analyzing engagement according to each of the sensory processing patterns, i.e. comparing participants with typical scores to those with scores different from the norm in each of the four quadrants, revealed distinct differences in engagement that were not noted when analyzing engagement across the pooled sample. The task utilized in this study, a messy craft occupation, was selected because of its potential to provide sensory input. Accordingly, participants with low thresholds
demonstrated less engagement in the task perhaps reflective of their efforts to minimize exposure to the materials. In contrast, participants with high thresholds and active behavioral regulation appeared to benefit from the added component of using the color of their choice suggesting that on their own, the materials may not have provided sufficient sensory input to satisfy their needs but that using their preferred colors increased the sensory impact of the materials. Demonstrating differences in participation in an everyday task according to sensory processing patterns lends credibility to the model and motivates further research to determine the impact of sensory processing patterns on participation, the underlying mechanisms which influence sensory processing patterns, and intervention methods to employ when sensory processing patterns disrupt participation.

**Limitations**

Although the information gained from this study is useful to occupational therapists, several limitations must be considered. Though we have reported significant findings, the effect sizes are minimal to small. This may reflect the minimal need for therapeutic intervention in our typically developing sample of children. We were unable to test this as recruitment of children identified as having sensory processing disorder without other major diagnosis was particularly challenging. Consequently, it is not clear how children identified with sensory processing disorders might respond to a messy craft occupation when provided choice. Having participants engage in both conditions in a counterbalanced manner may have strengthened research design. Generalizing the findings of this study to other child populations must also be considered carefully because the sample only included children within a small age range that were financially capable of funding child daycare services. With the sample sizes used here, we face the possibility of having falsely rejected the null hypothesis. Finally, though tests of the primary
hypothesis and comparisons within sensory quadrants were planned during the design of this study, testing the effect of gender was not planned and therefore increased the number of tests of significance and the risk of findings resulting from multiplicity.

Conclusions

Our findings suggest that with a better understanding of sensory processing patterns and play preferences, child care providers, child educators, families, and therapists can plan activities to enhance engagement in occupations of childhood. The findings of this study reinforce that children may be influenced to engage in occupations that incorporate gender specific interests and significance. Occupational therapists treating children should employ interventions that appeal to their clients in order to enhance intrinsic motivation. In a study by Miller and Kuhaneck (2008) children reported that they perceived gender as an important variable that affected play preference. As the goal of therapeutic interventions is to improve performance, occupations that connect this relationship are more likely to increase participation. In future research exploring the influence of sensory processing patterns on engagement, the tasks selected should be chosen to appeal equally to both male and female participants.

We demonstrate that children with lower thresholds (i.e., sensory sensitivity and sensory avoiding behaviors) are less likely to engage in a messy craft occupation. Contrary to our hypothesis, providing choice of materials for a messy craft occupation did not improve engagement in children with low thresholds. Future research should explore methods to improve occupational performance in this population. Interventions should incorporate a wide range of sensory experiences that provide more opportunities for exploration. Dunn (1997) suggests blending familiar and novel stimuli into everyday experiences to facilitate occupational performance. Occupational therapists working with children who display low thresholds for
sensory processing should consider simplifying the environment and/or increasing the predictability of occupations to enable participation.

Choice positively influenced engagement in children with sensory seeking patterns. We speculate that when given choice, it is likely that children with sensory seeking behaviors experienced an internal shift in their locus of causality, leading to an increase in engagement. This extends the findings of Zuckerman et al. (1978), supporting choice as an internal motivator in a distinct population. Occupational therapy practitioners, who include choice in practice, may uncover an effective strategy for gathering information and enhancing the performance of children with sensory seeking patterns.
References


Table 1. Summary of Sensory Profile quadrant results for participants, number of participants whose scores fell into each range (n=20)

<table>
<thead>
<tr>
<th></th>
<th>Low Registration</th>
<th>Sensory Seeking</th>
<th>Sensory Sensitivity</th>
<th>Sensory Avoiding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical</td>
<td>15</td>
<td>8</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Probable Difference</td>
<td>3</td>
<td>8</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Definite Difference</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 2. Summary of correlations amongst measurements.
Pearson’s coefficient (r-squared), *p<0.05, **p<0.01

<table>
<thead>
<tr>
<th></th>
<th>Persistence</th>
<th>Involvement</th>
<th>Joint Attention</th>
<th>Affect</th>
<th>CBRS Total</th>
<th>Duration</th>
<th>Fun Scale</th>
<th>Child Body Map</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention</td>
<td>0.83(0.7)**</td>
<td>0.61(0.4)**</td>
<td>0.29(0.1)</td>
<td>0.4(0.2)</td>
<td>0.79(0.6)**</td>
<td>0.37(0.1)</td>
<td>0.12(0)</td>
<td>0.20(0)</td>
</tr>
<tr>
<td>Persistence</td>
<td>--</td>
<td>0.58(0.3)**</td>
<td>0.44(0.2) *</td>
<td>0.57(0.3)**</td>
<td>0.85(0.7)**</td>
<td>0.68(0.5)**</td>
<td>0.16(0)</td>
<td>0.13(0)</td>
</tr>
<tr>
<td>Involvement</td>
<td>--</td>
<td>--</td>
<td>0.57(0.3)**</td>
<td>0.53(0.3)**</td>
<td>0.81(0.7)**</td>
<td>0.33(0.1)</td>
<td>0.03(0)</td>
<td>0.24(0.1)</td>
</tr>
<tr>
<td>Joint Attention</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.77(0.6)**</td>
<td>0.78(0.6)**</td>
<td>0.55(0.3)**</td>
<td>0.18(0)</td>
<td>0.21(0)</td>
</tr>
<tr>
<td>Affect</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.80(0.6)**</td>
<td>0.0.6(0.4)**</td>
<td>0.15(0)</td>
<td>0.28(0.1)</td>
</tr>
<tr>
<td>CBRS Total</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.63(0.4)**</td>
<td>0.14(0)</td>
<td>0.26(0.1)</td>
</tr>
<tr>
<td>Fun Scale</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.23(0)</td>
<td>0.23(0.1)</td>
</tr>
<tr>
<td>Child Body Map</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.24(0.1)</td>
</tr>
</tbody>
</table>
Participants engaged in a messy craft occupation. In the experimental group, they were given their choice of materials (Choice). In the control group, colors were randomly assigned to them. Engagement was quantified through use of a behavioral rating scale and duration of engagement. A. On the five subscales of the CBRS, engagement was similar across the two conditions except for Attention in which there were lower average scores in the Choice condition. B. There were no differences in the total CBRS Score. C. There were no differences in the duration of engagement. *p<0.05
Figure 2. Gender differences in engagement in a messy craft

Girls showed more engagement in the messy craft than did boys on a number of measures of engagement. *p < 0.05.
Figure 3. Differences in engagement according to sensory processing patterns.

A.

Quadrant 3: Sensory Sensitivity

B.

Quadrant 4: Sensation Avoiding

Participants were grouped according to the Sensory Profile scores in each quadrant (Typical, and Non-Typical (those with a Probable or Definite Difference)) through comparison with normative data for the assessment.  
A. Participants with scores indicative of Sensory Sensitivity had lower scores in Joint Attention, Affect, and on the CBRS Total score.  
B. Participants with scores indicative of Sensation Avoiding had lower Joint Attention.  *p<0.05
Figure 4. Choice is selectively effective in Sensation Seeking

Participants were grouped according to the Sensory Profile scores in each quadrant (Typical, and Non-Typical (those with a Probable or Definite Difference)) through comparison with normative data for the assessment. When assessing engagement in the messy craft according to the condition (No Choice or Choice) there were significant interactions in A. The CBRS Item Affect, which was more positive in the Choice, compared to the No Choice, condition only in the participants with Non-Typical scores and B. The CBRS Total score such that the decrease in scores from the No Choice to the Choice condition in the participants with Non-Typical scores was less than in the participants with Typical scores. There were no main effects of group or condition, indicating that the effect of the Choice was select to the participants with Non-Typical Sensation Seeking Scores.
Appendix A

Fun Scale

Adapted from Melchert-McKearnan, 2000
Appendix B

Child Body Map
Appendix C

Child Behavior Rating Scale

(1.) Attention:

This scale assesses the extent to which the child attends to the occupation. While the child may or may not be actively involved in the occupation, the child rated as demonstrating high attention remains engaged in the occupation for an extended duration. A child rated as low in attention may briefly participate in the occupation never seeming to attend to the occupation for more than a few minutes at a time.

**Very Low (1):** The child never attends to the occupation for more than a few minutes. He or she may completely stop the occupation for extended periods of times with little engagement.

**Low (2):** The child is generally inattentive throughout the occupation. Although the child sometimes participates, he or she is more often inactive in the occupation.

**Moderate (3):** The child attends to the occupation as often as he or she does not. The time engaged in the occupation is comparable to the amount of time disengaged from the occupation.

**High (4):** The child is engaged in the occupation for the majority of the session. The child may have periods in which he or she is inattentive but these are short-lived and limited in number.

**Very High (5):** The child stays with the occupation throughout the entire session. The child participates in the occupation without periods of inattention.

(2.) Persistence:

This scale measures the degree to which the child makes an effort to participate in the occupation. A child scoring high on persistence makes several attempts at the occupation
demonstrating continuous engagement. Persistence also reflects the extent to which the child practices actions and vocalizations. A child scoring low on the scale makes little effort to participate in the occupation. He or she rarely practices behaviors or vocalizations during the occupation and quickly gives up.

**Very Low (1):** The child never demonstrates repetition of a behavior. The child who is very low in persistence may never attempt a second try.

**Low (2):** The child infrequently demonstrates repetition of a behavior. The child may make several attempts, but quickly gives up. The duration of the occupation is short-lived with little progress.

**Moderate (3):** The child has extended periods in which he or she seems to be practicing behaviors, but just as often has periods in which he or she does not. The child continues to engage as often as he or she gives up.

**High (4):** Although the child has some periods in which he or she quickly gives up or during which repetition of behavior is rarely seen, in general, the child can be described as high in persistence. The child is often observed practicing behaviors relevant to the occupation.

**Very High (5):** The child frequently practices vocalizations during the occupation. The child is continuously engaged in the occupation with **NO** periods of disengagement. The child’s persistence is a highlight of his or her behavior throughout the session.

(3.) Involvement:

This scale reflects the intensity with which the child is involved in the occupation. The child who is high in involvement is actively involved throughout the majority of the occupation. This child appears to be highly motivated to engage in the occupation. He or she is intent on participating in the occupation and seems to derive satisfaction from the occupation. The child
who is low in involvement is either passively involved during the occupation or is highly
distractible during the occupation. This child may stay with the occupation but seems to derive
little satisfaction from his or her involvement. The child may frequently look at the camera or
ask inappropriate questions that inhibit engagement.

**Very Low (1):** The child obviously does not derive satisfaction from the occupation. The
child shows a great deal of neutral affect as well as some distress or avoidance in the occupation.
When the child does participate, he or she seems to be “going through the motions” rather than
actively participating.

**Low (2):** This child, for the most part, does not derive satisfaction from his or her
participation in the occupation. The child may show largely neutral affect and may appear
passive during the interaction. The child’s behavior may appear to be largely “rote” for the
majority of the occupation.

**Moderate (3):** The child derives some satisfaction for the occupation. There are
sustained periods in which the child seems intent on what he or she is doing or uses gestures or
vocalizations to express satisfaction with the occupation. There are also extended periods in
which the child seems to be “going through the motions” or is disinterested in the occupation.

**High (4):** The child can be described as highly involved. During the majority of the
session, the child appears to derive satisfaction from his or her participation in the occupation.

**Very High (5):** The child is highly involved throughout the session. This child appears to
be highly motivated to engage in the occupation. He or she derives a great deal of satisfaction
from participating in the occupation.
(4.) Joint Attention:

The extent to which the child initiates interaction with the adult is measured using this scale. The child receiving a high rating has frequent and lengthy bouts of eye-contact and other sharing behaviors such as vocalizations. This child tries to engage the adults by using vocalizations, gestures, and facial expressions. A child scoring low in attention may rarely have eye-contact or engage the adult through vocalizations or gestures.

**Very Low (1):** The child never attempts to engage with the adult. The child never engages in periods of eye-contact or vocalization with the adult.

**Low (2):** The child occasionally attends to the adult by demonstrating eye-contact. For the most part, the child does not attempt to vocalize or engage the adult.

**Moderate (3):** The child attends to the adult approximately half of the time. He or she demonstrates periods of eye-contact and engagement with the adult, but equally demonstrates periods of inattention. This child may have extended periods of eye-contact but more in response to the adult’s behavior than an attempt to engage the adult.

**High (4):** The child attends to the adult for the majority of the session. He or she is often observed to actively share experiences through eye-contact and vocalization.

**Very High (5):** The child has frequent and lengthy bouts of eye contact with the adult. He or she often vocalizes while looking at the adult and attempts to share experiences as well. The child is characterized by his or her frequent attempts to engage the adult.

(5.) Affect:

This scale reflects the child’s general emotional state during the occupation and/or interaction. A child receiving a high score overtly demonstrates positive affect and enjoyment whether it be directed toward the adult or the occupation itself. This child may frequently smile, laugh, or
vocalize with the adult or during the occupation. A child scoring low on this scale frequently demonstrates anger or distress during the interaction and/or occupation.

**Very Low (1):** The child demonstrates a great deal of distress during the interaction and/or occupation.

**Low (2):** While the child does not demonstrate distress throughout the interaction and/or occupation, there are several sustained periods in which the child is distressed.

**Moderate (3):** The child, in general, displays low intensity enjoyment. This child can be generally characterized as sober or neutral in affect.

**High (4):** For the most part, the child can be described as happy. He or she shows some neutral affect, but most often appears to be happy during the occupation.

**Very High (5):** The child often vocalizes, laughs, or smiles when interacting with the adult and engaging in the occupation. He or she never demonstrates negative affect.
Author Note

We are grateful to the individual children and their families for their participation and contribution to this study. We thank Kathleen LaFountain and her staff for contributing to participant recruitment, providing organizational support, and allowing data collection to take place at their after school programs (Whitmer High School, Calvary Church, and Whittier Elementary School). We would also like to thank occupational therapy student Abby Enser for her assistance with data coding.