

AN ANALYSIS OF THE DEVELOPMENT OF FINE MOTOR SKILLS IN CHILDREN

Question: The development of fine motor skills in children is essential because by learning how to grasp and manipulate objects, children expand their knowledge because they are better able to explore and understand objects and their usage. Understanding the development of these skills is important in diagnosing and helping children who have difficulty acquiring certain fine motor skills, but is also helpful for parents and educators so they can teach and encourage important motor skills to aid children in normal development. Fine motor skills are crucial to the social development of a child as these skills help in simple tasks such as using scissors, eating with a spoon, drawing, and building with blocks. In an attempt to understand the development and acquisition of fine motor skills in children, we ask ourselves: Is there a difference in the way children in preschool and kindergarten learn how to handle small objects? The exploration of this guiding question will shed light on how children learn, through experience, the most efficient way to grasp and manipulate objects.

Context for addressing the question: Naturalistic observations were conducted because they would provide more accurate results of children's fine motor skills, since the actions of the children would not be interfered with. Naturalistic observations also increase the external validity of the study as the results can be more easily generalized since the children were observed in an everyday setting. The observation of preschool children, with an average age of 50 months, was conducted on Tuesday, October 3, 2017, from 9:45 to 10:30 AM in a classroom at the Children's School (see Figure 2 for a diagram of the classroom setting). Seven children were observed in this age group, with four females and three males. The setting of the preschool classroom greatly encouraged the development of fine motor skills, as seen through the following stations: coloring station, ball station, blocks station, and two puzzle stations. The coloring station provided the children with thick markers to aid with gripping and maneuvering; the ball station boasted small, colorful balls which could be attached together to create different shapes; the blocks station included small blocks of different shapes; one of the puzzle stations had peg puzzles which encouraged the pincer grasp, and the second station had a regular, large piece puzzle to encourage the pincer grasp and the use of both hands. The teachers aided in the development of the children's fine motor skills by helping

children maneuver small objects and teaching them how to handle small objects by demonstrating the technique, then watching the child as they mimicked the behavior.

The observation of kindergarten children, with an average age of 61 months, was conducted on Tuesday, October 3, 2017, from 8:45 to 9:30 AM in a classroom at the Children's School (see Figure 1 for a diagram of the classroom setting). Eight children were observed in this age group, with three females and five males. The kindergarten classroom was arranged with different stations, or tables, and each table encouraged a different fine motor skill, similar to the preschool classroom. The tables included: a light table, a coloring table, a crafts table, and a snack table. The light table aided with the development of the pincer grasp, because the activity was to place clothespins on a board in a specific order; the coloring table provided thick markers to aid children in grasping and handling the markers to draw; the crafts table consisted of several arts supplies, including scissors, tape, paper, and markers, so children can make their own creations; the snack table offered applesauce and crackers, and indirectly aided children in maneuvering the spoon and the food without spilling. The teachers in the kindergarten classroom also aided children in their development of fine motor skills, but were less instructive than the teachers in the preschool. They offered suggestions only when a child was particularly struggling; otherwise the children were self-motivated to figure out how to handle small objects on their own.

Observations as relating to specific theories or concepts: In relation to endurance, coordination and activity level, there were some clear differences in fine motor skills between the two age groups. Kindergarten children had higher endurance and greater coordination compared to the preschool children, as they were able to continue with the same activity until it was completed and adapt their fine motor skills to fit the current activity. The preschool children were not able to use their fine motor skills for extended periods of time and did not have effective coordination, so they had to rely more on guidance from the teachers. Both groups had around the same activity level on average. These observations, as well as observations relating to specific activities, showed how kindergarten children are able to learn how to handle small objects with greater ease, as they are able to change their grasps and adapt their fine motor skills to fit the demands of different activities.

In order to capture and explain the development of fine motor skills in children, four theories must be discussed: Piagetian, information-processing, sociocultural, and dynamic-systems. These theories overlap in many of their core ideas, and are more effective in describing the development of fine motor skills together rather than separately.

Piaget's constructivist approach to understand children's cognitive development focused on the idea of the active child, in which the child greatly contributes to his or her own development (Siegler, DeLoache, Eisenberg, & Saffran, 2014). In the observations conducted, the active child perspective was more visible in kindergarteners than preschoolers, as kindergarteners had more opportunity to work by themselves and through trial-and-error, whereas the preschoolers were closely guided and directed by teachers. As an extension of the idea of the active child, Piaget also believed that children generate hypotheses, perform experiments, and draw conclusions in order to further their learning, and he assumed that children are intrinsically motivated to learn and do not necessarily need guidance from others. Both of these assumptions were also observed in the children from both groups. One girl in preschool was playing with the blocks and was alternating between using the pincer grip to pick up small blocks and grasping the blocks with her whole hand. She was having difficulty in lining up the small blocks in a row, and tried and failed many times to place the small triangle blocks exactly where she wanted them. In an effort to solve this problem, she began picking up the object with her less dominant hand, transferring it to her right (dominant) hand (though she had difficulty doing this as well), and placing it randomly on the table, but upright, all using the pincer grasp, then sliding the piece into place by pushing it with her finger. In this way, the girl moved beyond using simply her pincer grasp and learned how using her other fingers separately can also help with certain tasks. Piaget's idea of drawing conclusions through experiments is thus depicted in this girl's behavior, however, it was not observed in the behavior of any of the kindergarteners in relation to the development of their fine motor skills. Piaget's assumption that children were intrinsically motivated, however, was seen in the preschoolers but was especially apparent in the kindergarteners. In one instance, a kindergarten boy was eating applesauce with a spoon, and using the pincer grip, brought the spoon to his mouth. However, some applesauce would always spill before he brought it to his

mouth. He discovered that if he used his free, less dominant hand, to move the applesauce cup towards him *while* he was bringing the spoon to his mouth, if any applesauce fell, the cup would catch it. He did not need guidance to figure how to move the cup and the spoon at the same time, rather, he improved his fine motor skill coordination on his own, by expanding from just using the pincer grip to using his other hand to grasp the cup. He thus demonstrated Piaget's third assumption, that children are intrinsically motivated to learn.

Both of these examples can also be extended to the information-processing theories because they show how children adapt and extend their knowledge of fine motor skills (strategy) to overcome an obstacle (Siegler et al., 2014). Problem solving was also apparent, especially when children of both groups used their less dominant hands to hold paper down while they were drawing with their dominant hand. Planning as a subset of problem solving was visible when a boy in the kindergarten group was making a long mask at the crafts table. He used both hands, one to cut paper, the other to hold the paper down, to create the ring of the mask that would fit around his head. Then he decided to take several whole sheets of paper and tape them together, pulling the tape with one hand and holding the basket with the tape in place with the other hand so it did not fall down. When he had to fold the mask to put it away during clean-up time, he decided to wear the mask as it would be easier to use both hands to fold up the mask in the way he desired. In this way, planning was a crucial part in the development of the child's fine motor skills because he had to decide how to manipulate the materials using both hands in order to create a desired product, thus reinforcing a main concept of the information-processing theories.

The sociocultural theory of guided participation was also observed in children from both age groups. In the kindergarten group, guided participation was seen when the teacher explained to a girl how to place clothespins more effectively on a board. The teacher showed the child how to organize the clothespins, and the child mimicked the teacher's actions by then using both hands to organize the clothespins in order, with one hand holding a clothespin and the other hand turning another clothespin to examine it. Vygotsky's theory of children as social learners was displayed here, but was more clearly shown in another example, when a preschool boy was attempting to connect dots on an iPad.

The teacher held the child's hand, depicting guided participation, but the teacher also verbally explained how to hold and move the pencil, outlining the second part of Vygotsky's theory that children are not only social learners, but are also intertwined with people who want to help them gain skills and understanding (Siegler et al., 2014).

The dynamic-systems theories show how change occurs over time (Siegler et al., 2014), and are incredibly relevant to these observations because they show how children's fine motor skills are more advanced when they are older. In this case, kindergarteners' fine motor skills are more advanced than preschoolers' fine motor skills. One of the key points of dynamic-systems theories is that when children learn how to grasp and manipulate objects, they expand their knowledge of objects and their usage. When the preschool and kindergarten children use different grasps to hold and manipulate objects, they learn about the object's properties and the uses of the object.

Dynamic-systems theories also posit that changes occur through variation and selection. One of the most defining differences between preschool and kindergarten children is that preschool children have more variation in their fine motor skills, and kindergarten children exhibit more consistent selection with their fine motor skills. For example, one of the girls in the preschool, when exploring the pin board, sometimes used the pincer grasp to select each pin, and sometimes used all her fingers to grasp the pin. This shows variation in fine motor skills for a single task. Kindergarteners, however, were more consistent with their selection of fine motor skills for each activity.

Conclusion: Thus, in concordance with the observations and the theories of learning, we have learned that there is, in fact, a difference in the way preschoolers and kindergarteners learn how to handle small objects. Kindergarteners are more intrinsically motivated to shape their fine motor skills and show more evidence of planning and problem solving by adapting their fine motor skills than do preschool children. Preschool children, as they are in the earlier stages of development, rely more on guided participation to learn how to handle small objects and adapt their fine motor skills. The four theories, Piagetian, sociocultural, information-processing, and dynamic-systems, illustrate how children use different learning techniques to develop fine motor skills depending on their age and experience.

Works Cited

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