Asian Social Science; Vol. 12, No. 4; 2016
ISSN 1911-2017 E-ISSN 1911-2025
Published by Canadian Center of Science and Education

Research on Status quo of Fine Motor Skill of Children Aged 3 to 6: Case Analysis of Kindergartens in Nanchong, Sichuan

Xia Wei[1]

[1] China West Normal University, China

Correspondence: Xia Wei, China West Normal University, China. E-mail: 709068201@qq.com

Received: January 26, 2016 Accepted: February 26, 2016 Online Published: March 18, 2016

doi:10.5539/ass.v12n4p125 URL: http://dx.doi.org/10.5539/ass.v12n4p125

Abstract

By combining methods of survey with questionnaire, the author investigated the situation of fine motor skill of 330 children aged 3 to 6 in the junior, middle and senior groups of 11 kindergartens in three districts of Nanchong City, and conducted questionnaire on the children's parents' educational attitude toward fine motor. The survey data analyzed by SPSS shows that children's fine motor skill in Nanchong is improved as they are growing older; that their development of drawing, folding and cutting fine motor skill is relatively weaker; that there are some differences in skill level between genders, kindergarten categories and native places. The kindergartens should develop curriculum for development of children's fine motor. In "Motor development" objectives of *Learning and Development Guideline for Children Aged 3 to 6*, gender factor of affecting fine motor skill should be added. The kindergarten shall conduct differentiated instruction on boy's and girl's fine motor skill. Teachers and parents shall jointly support children's operation and exploration activities of fine motor, to contain training in life and to achieve family-kindergarten cooperation and to promote children's fine motor skill hand in hand.

Keywords: children, fine motor, fine motor skill

I. Introduction

Fine motor skill refers to the movement mainly relying on small muscle and small muscle groups in body parts like hand and fingers, and the ability that can complete specific task by cooperating with various psychological activities such as sensory perception and attention. It is not only an important aspect of individual's early development, but a significant foundation of development of other aspects of an individual. (Payne & Larry, 1995) Children's fine motor skill is mainly reflected on application of hand motions, as well as motor abilities based on hand motions, such as grabbing, rotating, kneading, drawing, cutting, folding, holding, and stringing, etc. Fine motor skill can make children realize the connections between various properties of things and the relations between things, promote development of perceptual integrity and concrete thinking, and has a significance to adapt to social life and realize self development. To provide the basis for children parenting and kindergarten educational activities, the research team tested and surveyed children aged 3 to 6 in Nanchong city toward clay modeling, finger touching, stringing, drawing, cutting and folding, etc., and conducts questionnaire on parents' parenting attitudes on fine motor. On the basis of understanding present situation, the author analyzed present defects and proposed educational strategies for improvement.

2. Research Methods

2.1 Research Objects

By stratified random sampling method, the author selected children aged 3 to 6 in 11 kindergartens in three districts in Nanchong city for survey. Among the 11 kindergartens, 5 are from Shunqing District; 3 from Jialing District; and 3 from Gaoping District. For each district, we selected one urban public, urban private and town kindergarten. In specific research, we selected two more urban public kindergartens in Shunqing District, because it has more population. In every selected kindergarten, we randomly sampled 10 children whose age concentrates in three months of same year. The amount of surveyed children aged 3 to 6 are 330, among which there are 165 boys, and 165 girls, between which the ratio of male to female is 1:1.

2.2 Research Tool

The survey method is applied from research methods about fine motor in *Evaluation Handbook of Education*

Quality of Kindergarten (Elementary Educational Research Department of China National Institute For Educational Research, 2009) edited by Preschool Educational Research Department of China National Institute For Educational Research, and *Children Development Assessment Handbook* (Bai, 2002) written by Bai Aibao. According to realistic condition, we selected "clay modeling" and "finger touching" from survey methods of fine motor in *Evaluation Handbook of Education Quality of Kindergarten*. From *Children Development Assessment Handbook*, we select four items, "drawing", "cutting", "folding" and "stringing". For each of the above tests, according to children's accomplishment degrees, we respectively used 0, 1, 2 and 3 to indicate points. Before formal survey, we randomly selected 8 children from the junior, middle and senior groups in one kindergarten in Shunqing District to do pretest, so as to standardize survey staffs' operational methods and scoring standards. The survey environment is required to be quite, bright, with proper desks and chairs, and without class teachers or parents. At first, the research team conducted the reliability analysis for interviewers, and investigated the team members' scoring for 24 children from 3 grades. The coincidence rate between scores is 98.7%. In addition, based on questionnaires of fine motor influencing factors by Kong Yanan (Kong, Sun, & Liu, 2009) and Hou Rulan (Hou, Xia, & Wang, 2004), etc., the research team formulated Questionnaire of parents of children aged 3 to 6 in their concepts and behaviors of training fine motor, which contains three dimensions: parents' awareness, attitudes and adopted actions toward fine motor development. After survey, the questionnaires were issued promptly. The issuing objects are parents of children who have just received survey. The survey data was managed and analyzed by Excel and SPSS17.0 software.

3. Research Result and Analysis

3.1 General Situation of Fine Motor Skill Level of Children Aged 3 to 6

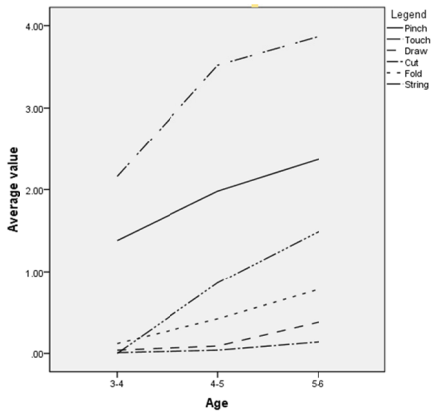

Figure 1. Tendency chart of average score of each item of fine motor skill level of children aged 3 to 6

Figure 1 shows that the fine motor skills of children aged 3 to 6 are improved when they are growing older. Their various skills, including "pinching, touching, drawing, cutting, folding and stringing" are enhanced along with growth, but such increases have significant differences. For example, their skill in finger touching and stringing are improved greatly, but almost the children in the junior, middle and senior groups are at the same level for "cutting" skill, on which they improve relatively lower. Obviously, children aged 3 to 6 have stronger "touching, pinching and stringing" skills than "folding, drawing and cutting" skills, among which their relatively weaker skill is drawing along the side line, and their weakest skill is cutting paper. Most children are not able to draw and cut along the lines. Even they can, they do the work irregularly. According to *Learning and Development Guideline for Children Aged 3 to 6* (hereinafter referred to as the Guideline), "children aged 3 to 4 can use scissors to cut along the straight line and they can basically match the sides and lines; children aged 4 to 5 can cut a sample shape constituted by straight lines along the contour line and match the sides and lines; children aged 5 to 6 can cut a simple shape constituted by curves along the contour line and match the sides and lines, which should be smooth" (Li & Feng, 2013). The research finds out that the fine motor skills of children aged 3 to 6 in Nanchong City, especially their "cutting" ability, is far more behind the objective proposed by the Guideline. In this research, few children aged 3 to 4 can cut the paper basically along the sides and lines, and few children aged 5 to 6 can cut paper smoothly. It is worth further surveying and verifying whether the problem is due to too high reference objective or existing problem of self development of the research object.

3.2 Group Difference in Fine Motor Skill Level of Children Aged 3 to 6

3.2.1 Gender Difference

Table 1. Gender difference in average score of fine motor skill of children aged 3 to 6

	Gender	N	Mean	Std.Dev	Std.Err	t	sig.(2-tailed)
Fine motor average score	Male	165	.73492	.383025	.029818	-2.271	.024
	Female	165	.83182	.392057	.030522		

From Table 1, it can be seen that the critical confidence level corresponding to the calculated statistical value "t" is lower than the set confidence level 0.05. This indicates that male and female children have remarkable difference in fine motor skill, and male children's fine motor development level is basically lower than that of female children. By comparison of each item in Table 2, in the junior stage, female children's "stringing" ability is slightly weaker than male children, but they improve fast and exceed male children when they reach to middle class. In the middle stage, male children's "cutting" ability catches up and exceeds female children, but female children surpass male children by a large gap at all abilities when they grow to the senior stage. The difference in fine motor skill between male and female children is closely related to their characteristics of carpus growing. "Girls' semilunar bone in carpus appears when the girls are 3, but this happens when boys are 3 years and 9 months old; girls' trapezium and trapezoid bones appear when they are at the age of 4.5, but for boys this happens when they are at the age of 6; girls' pisiform appears when girls are at the age of 9, and boys have this when they are at the age of 11.5; the girls are 2 years earlier than the boys to complete carpus maturity" (Li, 1997). As we know, the motion of small hand muscles mainly relies on carpus. Since female children's carpus maturity is earlier than male children, female children's motor skill that relies on small hand muscles is obviously better than that of male children.

Table 2. Gender difference in average score of each item of fine motor skill of children aged 3 to 6

Grade	Gender	Pinch	Touch	Draw	Cut	Fold	String
Junior	Male	1.31	2.02	0.04	0.01	0.10	0.28
	Female	1.46	2.25	0.04	0.01	0.13	0.27
Middle	Male	1.94	3.35	0.08	0.05	0.31	0.86
	Female	2.01	3.70	0.08	0.03	0.53	1.08
Senior	Male	2.28	3.85	0.33	0.12	0.61	1.50
	Female	2.45	3.90	0.42	0.17	0.95	1.55

3.2.2 Difference in Kindergarten Category

Table 3 presents that children in the junior and middle groups in private kindergartens have lower fine motor skill levels than children at same classes in public kindergartens, but fine motor skill level of children in the senior groups in private kindergartens is far beyond children in the senior groups in public kindergartens. Three—group difference comparison shows that the difference of the junior and middle groups between different kindergarten categories is not significant, but the difference of children's fine motor skill level between public and private kindergartens grows quite obvious when it grows to the senior stage. According to the research by Kong Yanan, etc., fine motor development of children aged 1 to 3 are related to mothers' education degree, main responsible caregivers' attitude toward early education knowledge and frequency of fine motor game training. (Kong, Sun, & Liu, 2009) Children aged 3 to 6 have entered kindergarten and spent most of their time with companions and teachers in the kindergartens, so that teachers' attitude toward early education knowledge and whether kindergarten have frequent fine motor games would directly influence fine motor skill level of children in the kindergarten. Nanchong City's private and public kindergartens have few differences in children's fine motor skill level when the children are at the junior stage. However, after two-year learning, they have significant difference when the children reach the senior stage. Is this indicating that public and private kindergartens in this city have differences in implementations of fine motor game activities, or kindergarten teachers in different kindergarten categories have different attitudes toward children's fine motor training? These problems remain to be further analyzed and confirmed.

Table 3. Kindergarten category difference in fine motor average score of children aged 3 to 6

Grade	Kindergarten category	Average score	sig. (2-tailed)
Junior group	Public	0.460	0.159
	Private	0.38	
Middle group	Public	0.792	0.680
	Private	0.767	
Senior group	Public	1.055	0.023
	Private	1.196	

3.2.3 Difference in Native Place

Table 4. Native place difference in fine motor average score of children aged 3 to 6

Grade	Native place	Average score	sig. (2-tailed)
Junior group	Urban	0.422	0.775
	Rural	0.403	
Middle group	Urban	0.810	0.572
	Rural	0.770	
Senior group	Urban	1.131	0.747
	Rural	1.158	

By comparing fine motor skill levels between rural and urban children, it is found that fine motor development level of children in junior and middle groups in rural kindergartens is lower than that in same-level classes in urban kindergartens. However, children in the senior groups in rural kindergartens are far beyond urban children at same grade at fine motor development level. The difference in fine motor skill level between urban and rural children aged 4 to 5 is more obvious than children aged 3 to 4 and 5 to 6.

Table 5. Native place difference in average score of each item of fine motor of children aged 3 to 6

Grade	Native place	Pinch	Touch	Draw	Cut	Fold	String
Junior	Urban	1.475	2.20	0.038	0.013	0.131	0.215
	Rural	1.133	2.033	0.044	0.011	0.078	0.444
Middle	Urban	2.069	3.575	0.071	0.038	0.475	0.882
	Rural	1.717	3.367	0.122	0.044	0.278	1.144
Senior	Urban	2.456	3.838	0.354	0.154	0.729	1.499
	Rural	2.133	3.967	0.444	0.111	0.911	1.578

From Table 5, it is clear that at the junior stage, rural children only surpass urban children at “drawing” and “string” fine motors, but they catch up and exceed urban children at “cutting” at the middle stage. In the senior groups, they perform better than urban children at four abilities, “touching”, “drawing”, “folding” and “string”. As growing older, rural children gradually exceed urban children. In survey of six fine motor skills, rural children have leading position at four items. Urban children have superior living conditions. Through questionnaire of parents, it is found that 76% urban children have participated interest classes like clay sculpture, paper cut and drawing, etc., before entering kindergarten, and the rate of rural children is only 6%. Therefore, at the initial stage of entering kindergarten, urban children’s fine motor skill level is far beyond rural children’s.

As the children grow older, rural children’s fine motor skills gradually surpass urban children’s. Is this because of the difference in kindergartens’ educational approach or difference in parenting way? Some researchers have conducted comparative research on parenting way of urban and rural parents of children and found, implementation of one-child policy is concentrated in cities, so that cities are inclined to “child-oriented” educational way and that urban parents’ make over-interference and over-protection is more than rural parents do.

(Lu, Zheng, & Li, 2007) Parents' over-interference and over-protection would reduce children's motivation in active learning and exploration, and decrease children's opportunities in practicing big and small muscle motor actions. In addition, as children grow older, they start to have self-consciousness, actively seek independence, have own idea while doing things, and want to do things "by their own", and would like to try themselves. If parents deprive children's rights and directly interfere in children's behaviors or handle all the affairs for the children, instead of offering chances to let children try, or supporting children's self-exploration behaviors, the children's inspiration of initiative operation and exploration would be greatly reduced and the children would gradually have dependent mentality. In this way, the children could not get enough exercise at all aspects and have lower physical quality. Modern people's physical quality is weakening with each generation, and the key factor influencing this is family's parenting attitudes. According to the questionnaires, 89% urban parents are not willing to let children draw and paint at walls in houses, and 79% parents do not support children to use knife or scissors without attendance of parents. In contrast, the proportion that rural children's parents express "do not care" at these two items are 74% and 66% respectively. Without over-interference or constraint, rural children have more freedom, as well as opportunities of operation and exploration by hands. Naturally, they have more chances to practice their small muscles. It thus can be seen that the difference in fine motor skill level is influenced by parents' parenting attitudes at a certain extent.

4. Suggestions and Reflections

4.1 To Strengthen Curriculum Suitable for Children's Fine Motor Development

Children stage is a key stage of fine motor development. This research finds out that children aged 3 to 6 have generally low fine motor skill levels, and few children can reach the reference standards of fine motor development set for children aged 3 to 6 in Guideline. Therefore, it is necessary to enhance cultivation of fine motor skill of children at this age. To promote children's fine motor development, one important approach is to strengthen curriculum suitable for children's fine motor development and appropriately give training of fine motor to children. While formulating kindergartens' fine motor curriculum objectives, it is important to note that various motor development objectives including "drawing, cutting, folding, pinching and stringing" shall be integrated. For organization and arrangement of teaching content, there should be emphasis, especially on improvement of children's ability of "folding, drawing and cutting", so as to train children to be able to draw and cut along sides and lines. For teaching methods and forms, it is necessary to pursue diversity and innovation, to inspire children's interest in exploring and operating by hands. For example, Chinese traditional folk games can be integrated to fine motor courses. Some researchers have found that there are many contents related to "cutting, folding, drawing and pinching" in fold games beneficial to improve children's fine motor development, such as hand-eye coordination, finger movements and fingers' stretching (Xiong & Lu, 2015). To develop and cultivate children's fine motor through folk games not only can inspire children's interests, enrich kindergartens' manual crafts activities, but also inherit precious Chinese traditional culture to children unconsciously.

4.2 Joint Support from Parents and Teachers to Children's Fine Motor Development

Parents shall not interfere in children's initiative operation and exploration activities too much, but support and encourage children's positive actions by applying hands. Parents shall be aware of giving more freedom to children and offering more chances to children to try and challenge themselves, as well as actively do housework and do some manageable things. In addition, parents can create an environment to provide chances to practice fine motor, such as accompanying children to make tools or learning materials, etc. In addition, parents can accompany children to watch children's show of hand-making, to inspire children's wish and interest in operation by hand, and draw, build blocks, make jigsaw puzzles with children at home. What the parents can do also include joining some parenting training courses, reading parent magazines, watching parenting shows, forming correct parenting ideas, and together with children participate in parent-child activities organized by early education institutions, in order to understand and support children's fine motor activities ideally, to actively participate in actions and to promote children's fine motor skill level.

Family-kindergarten close cooperation can better promote development of children's fine motor skill. In the process of training fine motor, kindergarten teachers shall let children use corresponding tools to complete activities under the circumstance of ensuring safety. For example, they can be bold and let children try to use knives and scissors to make handcraft products. During time for snack, when the distributed fruits need to be cut into small ones, teachers can let children actively participate and become assistants. While making teaching tools and toys, teachers can let children join and experience the fun of completing task together with teachers. When children wake up after noon napping, teachers should try best to let children button, lace up shoes and comb hair by themselves. While dining, teachers should encourage children to use spoon and chopsticks to eat by

themselves, which is to improve children's fine motor skill level from the daily life.

In addition, in field survey, researchers found that most children made mistakes while using paintbrushes and scissors. This is a main reason that many children could not do a good job in drawing and cutting along lines. On this subject, parents and teachers shall teach children the correct pen holding posture and labor-saving posture of seizing scissor consciously, and also teach children clever operation ways. For example, whole cutting complex patterns, they can teach children the ways to turn paper to facilitate cutting.

4.3 Differentiated Standards and Training for Male and Female Children Would Be More Beneficial to Develop Fine Motor of the Children

The research has found out that male and female children have significant difference in fine motors. Therefore, while evaluating development situation of children's fine motor development, the reference standards of male and female development level goals shall be differentiated. In *Learning and Development Guideline for Children Aged 3 to 6*, in the domain of children's health, growth standards of physical and psychological status are differentiated according to genders. It is suggested to add differentiated gender goals in the column of "motor development" in Guideline, so as to provide more specific references for parents and teachers. While implementing teaching, kindergarten teachers shall set tasks distinctively and give comments according to male and female difference in fine motor development level. For example, in activity of "cutting noodle", teachers can let female children cut thinner and more complex noodles (such as "instant noodle" which has curve lines), but ask male children to cut thicker and simple-model noodles (such as "dettuccine"- in china called Pugai noodle which is like the large quilt).

Acknowledgements

This research is one of the outcomes of Sichuan Key Research Institute of Philosophy and Social Science and Sichuan Key Research Institute of Humanities—Sichuan Province Education Development Research Center's financing/initiated project "Action Research on Folk Games' Influence on Children's Fine Motor Development" (item number: CJF14050). Thank you for their support.

References

Bai, A. B. (2002). *Children Development Assessment Handbook* (pp. 86-101). Beijing: Educational Science Publishing House.

Elementary Educational Research Department of China National Institute For Educational Research. (2009). *Evaluation Handbook of Education Quality of Kindergarten* (pp. 223-224). Beijing: Educational Science Publishing House.

Hou, R. L., Xia, L. L., & Wang, W. Q. (2004). Situation of Children's Fine Motor Growth in Xi'an City. *Chinese Journal of School Health, 25*(6), 682-683.

Kong, Y. N., Sun, S. Y., & Liu, W. (2009). Survey of Growth of Fine Motor of Children Aged 1 to 3 and Analysis on Influencing Factors. *Chinese Journal of Child Health Care,* (2), 145-146.

Li, J. M., & Feng, X. X. (2013). *Interpretation to Learning and Development Guideline for Children Aged 3 to 6* (pp. 294-295). Beijing: People's Education Press.

Li, L. J. (1997). *School Hygiene* (p. 17). Chongqing: Southwest China Normal University Press.

Lu, Q., Zheng, G., & Li, L. (2007). Comparative Study on Urban and Rural Parenting Approach of Children's Parents. *Journal of Neijiang Normal University,* (1), 148.

Payne, V. G., & Larry, D. I. (1995). *Human Motor Development* (3rd ed., pp. 222-223). California: Mayfield Publishing Company.

Xiong, L. X., & Lu, Q. (2015). Folk Games' Educational Values in Children's Fine Motor Development and Training. *Education and Teaching Research,* (9), 112.