

A Study on the Relations between Wooden Toy and Development of Infant and Young Children

Seung-Hee Yang¹, Mi-Hye Lee^{2†}

ABSTRACT

The aim of the present study was to investigate the relations between wooden toy and development of infant and young children by taking only the commercialized wooden furniture which would be suitable for the developmental area for infant and young children, among the physical environment influencing the balanced development and development for them. The recommended standard for them was the commercialized good and the only advanced toys for the development of infant and young children was primary selected, in case of different furniture for same purpose with regardless of manufacturer, country of origin and price.

The selected wooden toys for development of infant and young children covered the following test conditions. They keep the soft and clean surfaces and the corners are the round-finished so safe. The dyeing and coloring are so clear like the rainbow-colored in compliance with the international safety norm, and the paint material used are harmless to the people, because they have already passed the European Safety Norm EN 71 which is the most authoritative and strict standard in the world and contained accordingly little heavy metals, toxic substances and also allergy pigment under the maximum permissible standard. The size of wooden toys are not small enough for infant and young children to be able to swallow and this is important check point, because infants tend to feel the object in their own touching and therefore to have everything to the lip. The paint used was the toys-oriented goods and proved by the test regarding saliva and sweat.

Keywords : Infant and young children, wooden toy, developmental

1. INTRODUCTION

1-1 Purpose

Infant and young children search their environment positively with constant interest, curiosity and full energy, and satisfy their desire to know the object mostly through the actual goods. This step of their satisfaction phase of infant and young children means their development. Furthermore in this phase of infant and young children their rapid development happen and their basis of the social, emotional, language and cognitive development is built at the same time. Which environment is offered to infant and young children could be therefore the definite factor to determine their future. The environment here should mean all circumstances and persons being able

Received for publication: March 5, 2010 ; Reviewed: March 31, 2010 ; Accepted: May 15, 2010

1) Department of Early Childhood Education, Seoil University, Seoul 131-702, Korea

2) Department of Design and Crafts, Graduate School of Hongik University, Seoul 121-791, Korea

†Corresponding author: Mi-Hye Lee (E-mail: mihye888@paran.com)

to influence on infant and young children. Environment is classified human and material environment, and human environment means the personal relation like parent, teacher, the same age group and the person in the local community and so on. The material environment is the determining factor of the quality of the holism development for infant and young children. In the large enough place where infant and young children can play with different toys, their play activity can be executed vitality with the full energy, and their play takes long time and their behavior to play with the same age group can be showed. In case of the insufficient toys on the contrary, their experiences should be limited. Also in case of the toys which have poor quality and are not appropriate for them, the function of toys does not work and this can cause the disappointment of infant and young children and the aggressive behavior from their dissatisfaction about active playing.

The daily life of infant and young children consists of the play and activity mainly. The growth and development come rapidly as for infant and young children and they development is closely associated with the environment, so it definitely influences on the growth and development of infant and young children, how systematically and reasonably the material environment is planned and designed. Therefore it plays a meaningful role to present infant and young children the toys which are safe and appropriate for their development, in order to offer the personalized education for infant and young children who will be grown up as independent person. Toys mean in wide sense the objects surrounding infant and young children and interesting them and what the teacher and parent made by themselves, and also includes the commercial goods manufactured by companies, so there are countless sorts and quality. Not only the sorts and quantities, also the qualities of toys show the different levels. In one side the educational toys can be called, but in the other side there are many inappropriate toys which are not suitable for infant and young children due to their non-educational function and dangerous and unhygienic factors. Even some toys which are vulnerably exposed to the environmental hormone can threaten the health of infant and young children.

Hereupon the environment-friendly wooden material should be regarded as important. Wood can be used only for the environment of infant and young children for their playing, also for the wooden toys for them, and this logically influences on their development in the future and the importance of wooden toys is educationally raised. The natural grain of wood and scent are the characteristic being differentiated from the other material, and the Japanese cedar containing phytoncide works as deodorizing and antibiotic effects (Cho et al. 2009). Besides this, wooden toys which are suitable for the age and development step of infant and young children have different stories regarding the wooden toys themselves sufficiently and lead the emotional growth and development of sense, too. Furthermore wooden toys contribute to interesting infant and young children in studying by improving their logical and creative thought.

In this study the wooden toys which are suitable for the physical development, social and emotional development, language and cognitive development of infant and young children should be presented first of all, and the suggested wooden toys in consideration of the age and development step should be contribute to the holism development of infant and young children. Second, it should help the toy manufacturers to customize the wooden toys which are equipped with functional conditions like safety, suitability, durability, and economic feasibility, and also with the educational function for the physical, social and emotional and language and cognitive development of infant and young children. Third, this study would present a basis for the fusion science between the primary school division, design department (furniture, wood and painting), environment technology and educational technology in the future.

1-2 Scope and Methods

Scope of study was to observe the characteristic of development of infant and young children to define the concept and validity of the investigation, and to search the customized goods which are suitable for the development sector of infant and young children.

This study was conducted with the objects of the nursery institute offering the educational toys to the institute targeted for the infant and young children and the wooden toys were only selected among the international manufacturers of toys Wesco(France), Children's Factory(USA), Virco(USA), Community Playings(USA), Lakeshore(USA), Play Designs(USA), LEGO Education(Denmark), Nathan(France), Santa Factory(Thailand), SI Manufacturing(Canada), Feber (Germany), Klein(Germany), Ikea Mula(Sweden), Heros(Germany), HABA(Germany), Lolenze(Germany), Sevi(Italy), Chelona(Greece). Despite of the same wooden toys, they have 2 ~3 different influences on the development area of infant and young children according to the method of playing. In case of the toys for carpentry playing, infant and young children make cut and glue the wood and hammer a nail, and this experience help them to enhance the harmony between hands and eyes and at the same time the muscles are strengthened by the development of the sense. Infant and young children feel relaxing and sense of stability during the playing and it influences on their social and emotional development, and also the ability to solve the problem and to form the shape in three dimension and furthermore ceativity can be touched while they plans and carry out the paying, and the ability to count the number and to react about one-to-one function, comparison, classification and ranking concept are developed while they cut and glue the wooden pieces.

Like this the wooden toys have effects on the development of infant and young children from different aspect, but this study has selected the development filed of infant and young children touched mostly by the wooden toys. In case of the wooden toys having same purpose, but from various companies, the manufacture company, country and price were excluded for the selection, and the educational function influencing on the development of infant and young children was primary considered for the selection.

2. DEVELOPMENT OF INFANT AND YOUNG CHILDREN AND TOYS

2-1 Characteristics of development of infant and young children

Infant and young children are defined as early childhood from 0 ~ 5 age (before elementary school), and the basis of the development of infant is constructed in this phase. Namely, the rapid physical development and at the same time the development of the personality is built up in this important period on the basis of the social and emotional, language and cognitive aspect (Lee and Yang 2008). The following table 1 shows the characteristics of the development of infant and young children according to the physical development, social and emotional and language and cognitive development.

Table 1. Characteristic of development of infant and young children

	15 months	18 months	2 years	3 years	4 years	5~6 years
Physical development	- waking - crawling up the stairs	- walking without fall down - throwing the ball - going up the stairs with gripping one handrail	- running well - kick the big ball - going up the stairs alone with one step after one step	- riding the three - wheeler - going up the stairs with 2 feet	- going down the stairs with one step after one step - stand with one leg 4 ~ 8 seconds	- jump over with 2 legs (5 years) - stand with one leg over 8 seconds (5 years) - walking backwards (6 years)
Social and emotional development	- pointing the desired good and speaking - throwing the good for express joke or undesirable	- not perfect, but eating alone - tie and untie the strings to the toys - bring a particular toy (doll)	- put on simple cloths - playing house - calling themselves with the name	- shows on alone - releasing button - eating alone without spilling - understanding the thing step by step	- washing up - brushing teeth	
Language development	- speaking 3~5 words - touching the picture in the book - showing the shows on request	- speaking 10 words incl. name - finding the usual picture among the cards - carrying out simple order like "put it on the table" or "give mom" etc.	- speaking sentence with 3 words - executing 4 instructions	- speaking their sex (male, female) and name - understanding plural - telling the story of the picture book	- knowing colors and speaking one color at least - understanding 5 prepositions (e.g. over, under, after, front, beside)	- Speaking clearly red, blue and yellow (5 years)
Cognitive development	- stack wooden 2 pieces - imitating scribbles	- stack 3~4 wooden pieces - scribbling alone and playing with writing brush	- stack 6~7 wooden pieces - linking wooden pieces like train - imitating and drawing the vertical line and circle	- stack 9~10 wooden pieces - making bridge form with 3 wooden pieces - drawing circle and imitating the cross	- drawing the cross from the living model - repeating the 4-digit numbers - counting the 3 objects with right indication	- drawing human body in 3 parts (5 years) - counting exactly 10 objects (5 years) - drawing the square (5 years) - drawing human body in 6 parts (6 years)

2-2 Infant and young children and toys

Play is the essential activity for the right growth of infant and young children, and they adjust their growth by playing. At playing they generalize their concepts by displaying their abilities and making freely and searching the information, thanks to the toys that they can make touch directly and feel everything. In case of playing with block toys, they solve the negative emotions like aggression, fear and jealousy by stacking and tearing down the block toys and this process connect

an advance of emotional development. Furthermore the responsibility and cooperation ability are improved during playing with the same age group where the languages interaction are developed, and through this process language proficiency including speaking, reading and writing are promoted and enhanced. Beside this the power of observation, measurement and the thought capability to connect the cause and result are also advanced during the construction of formation with block toys. Furthermore the concept regarding the shape, size, length, height and location are studied and not only the universal relation between the part and the whole are understood, also the idea of the large or small number are recognized and the power of cognition are developed accordingly. Also the harmonizing power between the eyes and hands and the development of the big and small muscles are developed in the course of the playing with block toys.

Like this the toys are the definite factor to decide the quality of the education for infant and young children and the careful attention should be paid to the selection of the suitable toys for this age group. The toys should be selected in consideration of the functional condition like safety, suitability, durability, economical efficiency and utility, and also according to the educational standards like physical, social, emotional, language and cognitive development of infant and young children. The standards to be considered for selection are as follows : ① toys can be efficiently utilized only when the function should match with the development level of infant and the teaching and instruction of parent and teachers. Also the color, design, texture and good sense of touch fascinating infant and young children should be regard as important. ② safe and hygienic toys have to be selected. Safety and hygiene are the primary factor here. The material, forms, size and function of toys should correspond to the safety and hygienic maintenance. ③ consider durability! The easily broken toys disappoint infant and young children and cause the accident, so the strong toys need to be selected. ④ the pricewise toys should be selected. Reasonable price and economical efficiency play a role. ⑤ Utility should be considered, too. Toys including different functions, not with one fixed function, are preferred for the wide variety of utilization. Also infant should be able to use by themselves without any assistance of their parents and for such function toys must be moveable and easily to maintain. ⑥ toys to promote and enhance the development of infant and young children have to be selected. Toys must play a role to stimulate the holism development with regard to educational function. In other words the toys to advance the big and small muscles of infant and young children and to develop the creativity and imagination of them and finally to enhance the cognitive power and to promote the relation with other people should be the targeted object.

3. TOYS SUITABLE FOR DEVELOPMENT OF INFANT AND YOUNG CHILDREN

3-1 Characteristic of wooden toys

Wood is light and small in volume, but has high compressive strength and tensile strength and furthermore easily to process, and it's little thermal conductivity contributes to the keeping warm and keeping out and keeping the cold, and absorbing and blocking the sounds thanks to it's ability of absorption-adjustment. Also it is little changeable according to the temperature and the elasticity and tensility are high and the ability to absorb the impact and vibration is remarkable, and among other it looks beautiful. But it is flammable and the highly corrosive substance on the contrary, and it's shrinking and expansion can be pointed out as the weakness and the unstable strength according to the material and direction is also said as defect. The material supplementing such faults of wood can be the homogenized plywood, core-plywood, fiber-board, particle-board and MDF (Medium

Density Fiberboard) and the glued laminated wood. The wooden toys made of the wood with the high elasticity can provide infant and young children who have a lot of movements with the mild and warm feeling and friendliness and also decrease the eyestrain due to the ultraviolet rays. The wood extract is helpful to enhance the exercising furthermore and so it is closely associated with the holism development of infant and young children. Because the toys are one of the good mediums for infant and young children during their playing, the wooden toys made of the environment-friendly material should be recommended for infant and young children who are vulnerably exposed to the environmental hormone.

The characteristics of the wooden toys are as follows : ① the natural color and grain of wood can be visually appealed and the sense of color is naturally felt by infant and young children with the help of their learning the natural color itself. ② the natural texture and scent of wood can be sensed. Namely, the sense of weight and smoothness of wood is useful for infants developing the sense of touch and the natural fragrance contributes to the psychological relaxing. ③ wooden toys are mostly shaped in geometrical figuration. This results from the characteristic of the wood itself which is not easily to be curved and be expressed variously during production process. The weight of wood and simple form tends to the construction to stack more and more or to insert loosely. ④ wooden toys are not to be broken easily and the polluted wood can be renewed by the sandpaper, and the painting peeled off can be applied by the additional coat of paint. The recycling is available and the long-lasting usage like always the new one is possible accordingly.

3-2 Development area of infant and young children and wooden toys

Wooden toys are excellent medium to help infant and young children developing the physical development, social and emotional, language and cognitive learning. Therefore the selection of toys which are suitable for the development area of infant and young children would be important, and the toys made of the environment-friendly material especially are recommended as an efficient medium for infant and young children who are exposed to the environmental hormone, in terms of their holism development.

3-2-1 Wooden toys for physical development

Wooden toys which are suitable for the physical development of infant and young children can be classified in 2 sectors, namely for development of small muscle and large muscle.

Wooden toys for physical development of small muscle are thread a needle , puzzle and erect a tower and so on. Such wooden toys are useful for infant and young children improving their operation ability of hands by inserting, assembling and erecting the different wooden toys with the use of small muscle. While infant and young children make experiences like thread a needle, puzzle and cut and glue the wooden pieces and hammer a nail, their small muscle and physical adjustment are developed, and so to speak the physical development like a sense, ability to match eyes with hands and physical development of small muscle are increased. The following table 2 shows the images of the wooden toys being suitable for the physical development of small muscle of infant and young children.

Table 2. Images of wooden toys suitable for physical development of small muscle

 thread house	 thread cloths	 sense train	 board game	 erect tower	 dimensional figure	 crane block
 first block	 ring block	 wheel block	 creative train	 train & rail block	 crane block game	 cat track game
 ball track game	 roller coaster	 playing center	 wall decoration	 loom	 cog wheel board	 domino race
 master bolt set	 city puzzle	 puzzle	 hammer & nail	 Hammering Block	 tool box	 workbench

Source : <http://www.boyuksa.co.kr/>, <http://www.ikea.com/>, <http://www.toyton.co.kr/>

Wooden toys which are suitable for physical development of large muscle of infant and young children are the low climbing tool, balance beam tunnel and push and pull game, small rocking boat and slide and so on. The activity to stimulate the large muscle let the each part of the body of infant and young children develop in portion, and the function of the circulatory, excretive and respiratory organ improved. Furthermore the activity large muscle keeps the right attitude and develops the balance, harmonized mind, quickness and flexibility of the body and finally improves the security capability.

The low climbing tool is a simple device where infant and young children can make climbing. The size and height of this device should be decided according to the level of development of infant and young children and the area of the activity of large muscle. Regarding the low climbing tool, the portability and self-assembly are useful and can be connected with the ladder and board. The balance beam is helpful infant and young children keeping balance by walking, walking quickly, walking backward etc. There are the height-adjustable balance beam and the lineal or jig-jag shaped beam. The tunnel is for crawling of infant and young children. For the push and pull of infant and young children the handcart should be presented and the small bicycle and car are good idea in case of the large place and playing room inside. The rocking boat plays a role for infant and young children to sit down in and to play. If the boat lies on reverse, the stairs would be shown and the walking upward and downward is available. Also the rocking bear can be an alternative hereupon.

In case of the slide, the small one would be better for the inside installation and it can be combined with the low climbing tool. The table 3 shows the images of wooden toys suitable for physical development of large muscle.

Table 3. Images of wooden toys suitable for physical development of large muscle

 toddler	 doll buggy	 infant walker	 discovery wagon	 wooden bicycle	 rocking bear	 rocking horse
 throw fairy	 throw the ring	 caterpillar golf	 egg race	 box / cabinet	 balance beam	 wave balance beam
 seesaw game	 rocking boat	 UFO tunnel	 play house	 play design center	 slide	 swing
 throw board	 throw ring on the board	 wooden board game	 throw 5 rings	 two-walking	 bear train	 balance game

Source : <http://www.boyuksa.co.kr/>, <http://www.ikea.com/>, <http://www.toyton.co.kr/>

3-2-2 Wooden toys suitable for social and emotional development

Wooden toys which are appropriate social and emotional development are rhythm instrument, melody instrument, water pool, sand game, playing house set, unit block and so on. Ton and rhythm are an activity for infant and young children to express themselves and in the course of the self-expression they feel self-confidence and satisfaction, and emotional stability and creativity can be developed. In case of water and sand their multifunctional use give infant and young children the soft and smooth touch of water and the emotional stability while infants stack, dig and beat the sand. And also during the playing with the same age group, infant and young children experience social learning like cooperation with the other people and keep the rule etc, and their sociality is advanced accordingly. Infant and young children tend to express their desires by experiencing different role plays and to achieve the self-satisfaction and to find the emotional stability, and with the help of the different role playing they can come over the self-centered thought and behavior and improve the social development. Furthermore infant and young children resolve the negative feelings like aggression, fear and envy etc and relax the tension. The table 4 presents the images of wooden toys which are suitable for social and emotional development of infant and young children.

Table 4. Images of wooden toys suitable for social and emotional development

 focus rattle	 round rattle	 rattle village	 xylophone-fish	 instrument set	 instrument case	 easel
 kitchen workbench	 paying machine	 super market stand	 doll buggy	 dress up center	 playing house	 fantastic cave
 living in north pole	 triangular mirror house	 sailing boat game	 water & sand game center	 basis house	 unit block set	 hollow block

Source : <http://www.boyuksa.co.kr/>, <http://www.ikea.com/>, <http://www.toyton.co.kr/>

3-2-3 Wooden toys for language development

The listening, speaking, reading and writing material belong to the wooden toys suitable for language development. Infant and young children can increase their language proficiency by being interested in listening, speaking, reading and writing. In the course of the learning the language, infant and young children show interest in exact pronunciation, an grammatically perfect sentence, vocabulary etc. and learns language naturally by listening and repeating them and also the habit and attitude to learn good communication can be developed. Furthermore with the help of language as a good medium their thought and creativity can be advanced through the different language expressions. The following table 5 presents the images of wooden toys for language development of infant and young children.

Table 5. Images of wooden toys suitable for language development

 wooden play book	 save princess	 fairy story puzzle	 weather & season puzzle	 good day puzzle	 favorite thing puzzle	 story cases
 logic puzzle A	 logic puzzle B	 logic puzzle C	 logic puzzle D	 jobs imagination	 puzzle (Korean)	 crossword puzzle
 animal name puzzle	 connecting words game	 card game (noun)	 picture matching game	 thema game	 doll stage	 corner house

Source : <http://www.boyuksa.co.kr/>, <http://www.ikea.com/>, <http://www.toyton.co.kr/>

3-2-4 Wooden toys suitable for cognitive development

What belong to this group are material of classification, rank, understanding of number and space concept, measurement, measurement device and workbench and so on. Infant and young children let themselves develop by searching and operating the things and with these steps the ability to compare and classify, and to rank according to the capability and in order, so called what the basic understanding regarding the number, can be synchronizing increased. Infant and young children can clarify the concept of number through the concrete experience and enhance the ability to utilize the number in the praxis and finally understand the relation between the part and it's whole, and this understanding is a remarkable development of their logical thought. Besides this the basic measurement is experienced by infant and young children and the concept regarding time and space is started to be formed, and also the idea of different shapes is recognized. Infant and young children would achieve the ability to solve the problem through the observation, experiment and scientific research, and to understand the movement of the substances, and to be aware of the body of themselves and the natural phenomenon like animate or inanimate objects. Also the common and different point between the objects, the relation and causal relationship is understood and the performance to apply the scientific technology and idea to the actual praxis is developed together. While infant and young children play with wooden toys, their abilities to solve the problem and to construct three-dimensionally in creative way are developed thanks to the process to plan and practice the playing, and also the numbering, the one-to-one reaction, comparison, classification and ranking concept are learned. The table 6 shows the images of wooden toys suitable for cognitive development of infant and young children.

Table 6. Images of wooden toys for cognitive development

 different-sized cars	 sound & color block	 overlapped figure puzzle	 touch puzzle	 fruit & car puzzle	 mom & baby puzzle	 baby bingo color
 clothing puzzle	 society puzzle	 peacock puzzle	 stack balls	 learning figures	 basic figures	 miniature game
 searching food game	 color & number game	 flower dice game	 advanced pattern block	 wooden pattern block	 city construction puzzle	 counting game
 socks game	 big color board	 magnetic board	 magnet experiment	 reading glasses board	 bead sloop set	 workbench

Source : <http://www.boyuksa.co.kr/>, <http://www.ikea.com/>, <http://www.toyton.co.kr/>

4. RESULTS and DISCUSSION

This study investigated the relation between wooden toys and the development of infant and young children by taking only the commercialized wooden toys suitable for the development areas of them as the object. The recommended standard to select the wooden toys which are regarded as suitable for infant and young children is the commercialized goods and in case of different toys for same the advanced wooden toys only compared to the others in terms of the educational purpose was suggested, with regardless of manufacturer, country of origin and price. The followings result from the commercialized wooden toys which are suitable for the development field of infant and young children.

The selected wooden toys for development of infant and young children covered the following test conditions. ① they keep the soft and clean surfaces and the corners are the round-finished so safe. ② the dyeing and coloring are so clear like the rainbow-colored in compliance with the international safety norm, and the paint material used are harmless to the people, because they have already passed the European Safety Norm EN 71 which is the most authoritative and strict standard in the world and contained accordingly little heavy metals, toxic substances and also allergy pigment under the maximum permissible standard. ③ the size of wooden toys are not small enough for infant and young children to be able to swallow and this is important check point, because infants tend to feel the object in their own touching and therefore to have everything to the lip. ④ the paint used was the toys-oriented goods and proved by the test regarding saliva and sweat.

In fact, this study had a critical aspect, namely it was not very simple to select the toys according to general standard, for the international brands outside of Korea have been usually

preferred for the development of infant and young children. Therefore the follow-up case studies should be executed according to the following standards. 1) All wooden toys in international as well as in domestic cases for the same purpose have to be according to the same evaluation standard. 2) The related departments regarding wooden toys including pedagogy for infant and young children, design-, environmental- and teaching-technology should be advance the development of the target age and should suggest the standard which would be appropriate for the Korean circumstance. 3) The support proposals should be presented the toys manufacturer to be able to produce the investigated according to the evaluation standard.

5. REFERENCES

- Lee, M. H., and Yang, S. H. 2008. Suggestion of recommended design of furniture for infant and young children in terms of playing and learning. *Journal of Korea Furniture Society* 19(5):341-349.
- Cho, S. K. and No, E. H., Yang, S. H. 2009. Analysis of wooden toys for infant and young children. *Journal of Korea Furniture Society* 20(4):317-325.
- <http://www.boyuksa.co.kr>
<http://www.ikea.com>
<http://www.toyton.co.kr>

Submission Information

Submission of Korean paper can be accepted for next Korean volume 21(4) before May 31, 2010.

Chief Editor, Journal of the Korea Furniture Society