



## Research Article

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# Factors in the Design of Good Toys for Kids Aged 0-3 Years

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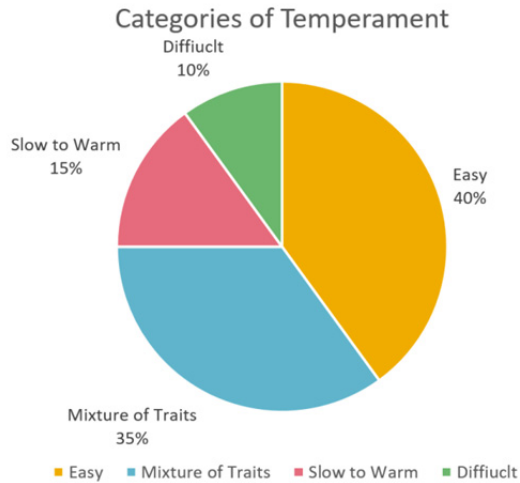
## Abstract

*The importance of ages 0-3 years of child life is considered the cornerstone of all dimensions of health for the rest of the child's life, which is the period in which children grow rapidly and there are many changes in every aspect of development. The purpose of this study is to learn the factors that are relevant to the design of toys for kids aged 0-3 years from development, behavior of children, and the characteristics of children's toys that are suitable for the ages, including safety. The researcher studied the guidelines for the design of kid's toys that were appropriate to the age range. This research is a combination that uses both quantitative and qualitative methods. The results of the study after trying playing toy sets from the study of toy design factors in kids aged 0-3 from 230 samples by observing behavior from a total of 80 children, then synthesizing the data for use in the design process, and evaluating by the parents of 150 children, found that it was at a good level, with average value ( $\bar{x} = 4.17$ ,  $SD = 0.39$ ). When comparing with playing toy samples from the Toy Industry Association of Thailand, it was found that there was a moderate level of satisfaction with the mean of 3.42 ( $\bar{x} = 3.41$ ,  $SD = 0.61$ ), and statistically significant at 0.05 level in all aspects. In conclusion, toys for kids in the age range of 0-3 years resulting from the study of 3 factors in toy design: development and behavior, playing methods, and safety are important links between each other. Development and behavior of children are consistent with the play methods because they affect the physical development of children by age, and safety in the design of toys is able to prevent the danger that could occur to kids.*

**Keywords:** Design Factors, Development and Behavior, Toys, Safety, Kids aged 0-3 years

## 1. Introduction

The development of children aged 0-3 years is an important process in helping to change systematically physically, intellectually, emotionally, and socially with changes. It might develop in a better or deteriorate way. It is expressed by emotions and behaviors to respond to stimuli, so the design of good toy for kids aged 0-3 years is necessary to understand the development and behavior of children during this ages. Children development is divided into physical, intellectual, language, social and emotional development. Each child has a different emotional characteristics or temperament from birth to life, which it might change according to parenting. Emotional characteristics and types of children, if viewed from the temperament, our children can be divided into 4 types as follows: (Apirudee, 2015)



**Fig 1:** The hierarchy of kids' emotional characteristics aged 0-3 years  
**Source:** The Author

Children with easy parenting, this group of children is easy to adjust, eat and go to bed on time, good mood, easy smile and concentrate, with about 40% of all children. Children with difficult parenting, in contrast to children with easy parenting, divided into very naughty and little naughty children, with an estimated number 10% of all children. Children with slow to warm, this group of children takes time to have self adjustment. Mostly, the children will look and remain silent, when feeling relaxed so that they will behave normally. Some children in this group need time to adjust to new situations for about 10-30 minutes, there is about 15% of all children. Children with mixture of traits, temperament is not indications that children are born to be stubborn, but being difficult of trait can cause parents to have less tolerance, and parents also have this temperament as well. If the parents are in the opposite temperament of the child, there may be problems in trait, this group of children is about 35% of all children. The emotional characteristics of each child are different in their ability to adapt because they have different temperaments from birth. Understanding the kids' temperaments along with knowledge of children development in each age range will help to design toys that match the characteristics of children in ages 0-3 years appropriately. Important development of 0-3 year-old children in each age group is as follows. (SiriKanya, 2016)

Development of newborn children in the 1st-5th month, they are able to smile, start to voice. They begin to move their heads more and can tilt their necks. Children can grab items and start turning their bodies forward and back. During the 6-11 months, children develop movement, begin to sit for a long time, begin to crawl and use their hands to catch things.

Development of 1-year-old children with movement, they can stand on their own and begin to walk, knowing how to use their eyes and hands. Children like to open the box and pick up the cup, like using one hand while the other hand doing other activities. Children of this age know their names and will try to practice speaking. They are able to understand simple words such as prohibiting doing things, starting social development and self-help. Children of this age are afraid of strangers and new places.

Development of 2-year-old children, they can walk up the stairs, but can't switch feet. They can jump 2 legs and kick a small ball forward. In the use of eyes and hands, kids between the ages of 2 years can connect 6-7 blocks, can open 1 book at a time and draw straight lines vertically.

In terms of language, kids of this age know about 50-300 words, start building simple sentences and also like listening to simple short stories. In terms of society and self-help, children of this age tend to act in a controlled and instructive manner, able to excrete well in the daytime and

can unzip.

Development of 3-year-old children, the movement in children of this age is that they can walk up the stairs, switch feet, ride 3 wheels, and stand for one second for 2 seconds. In the use of eyes and hands, children 3 years of age can connect blocks 8-9 layers, connect 6-12 pieces and write circles as an example. In terms of language, children of this age prefer to ask questions, tell stories and speak in sentences, know about 900 words and still know about 50 new words per month. In social and self-help, children start to play in groups, recognize waiting and like to copy parents' behavior and help with housework.

Based on this information, it can be concluded that the development and behavior of children aged 0-3 years is one of the factors necessary for toy design because it contributes to physical, intellectual, social and emotional, including lingual development. Therefore, toys can express the emotions and feelings of children. Such behavior is important to all aspects of child development, so choosing toys that are suitable for childhood is important in understanding the development of children in each age. Types of toys suitable for children aged 0-3 years can be divided into various types as follows. (Weihua and Ren, 2010)

Toys that allow children to explore and play easily are toys that let children to use small muscles such as mobiles, mirrors, baby gyms, bite toys, and toddler walking toys for children to interact with, suitable for children aged 10 months - 1 year.

Construction toys, block toys that do not have a fixed or fixed shape to allow children to create various shapes according to the child's imagination, including toys that have a connector like a nut or screw to allow children to create various shapes. An example of this toy is Lego.

Role play toys are professional uniforms, such as cashier machines, kitchen utensils

For children aged 0-3 years may be stuffed toys, hand puppets and puppets, doll houses or various themed toys.

The game is a 2 and 3-dimensional jigsaw puzzle toys for children to practice thinking and solving problems in many different types of games such as bingo, domino and chess.

Sports equipment and toys for children to relax are toys for riding and sports for young kids.

Various media toys are arts and crafts such as beads, crayons, simple mat weaving, until creating simple patterns, including musical instruments to make children feel fun and create sounds such as piano, flute, drums.

Learning toys are picture books for children to recognize colors and various vocabulary words, in addition, learning toys are abacus-style for children to recognize numbers, shapes, and color grouping.

From the type of toys for children aged 0-3 years that the researcher has studied, it can be summarized the importance of toys that are suitable for children in those ages that toys should be consistent with the physical development of the children, for example, the playing style should have a movement reaction and can choose to assemble objects of various shapes to help develop the small muscles that are suitable for the children's body. The toy model should have a way to play to solve problems by creating a role play so that children can have imagination and learning effectively. Toys must have colors, shapes, numbers, vocabularies, and music as elements in toys so that children can enjoy playing. However, caution about toys for children aged 0-3 years is the size of small parts in small toys which may cause the children to accidentally take into the mouths. Compressed toys such as airsoft guns, dart guns may bring harm to the children when the bullet hits the eye, causing bleeding until it can be blind and may result in behavior causing the children to absorb aggressive behavior from violent toys as well. Details of safety precautions for toy design are important things that should be studied.

Of course, in the design of toys that are beautiful, different, modern, distinctive, and create interest for children and parents, but it will be useless if the toy is not safe. The safety-conscious design represents the designer's ability and product reliability. Toys for kids are one of the products that must be inspected to be certified according to safety standards before being able to be used for children. Therefore, the knowledge of safety in toy design is necessary to be studied and understood. We can explain about the standard of toys for kids in the age range 0-3 years as follows. The dangers have different factors and levels of violence. The sudden danger is that the organs of the body are injured or deformed or may even die. The danger of poisoning is that, for

example, toys that contain lead causes damaged brain cells and kids are with delayed development, and lead will cause redness of the skin, affecting the brain in terms of perception and behavioral changes. It also depends on the age of the child as well, according to ASTM F963 (Mak and Lau, 2012), which states that it is prohibited to design small ball toys for children under 3 years of age. Small ball toys for children aged 3 years or older must have a diameter of 44.5 mm or more, with a warning about small parts and small balls as well.

At present, the production of toys to the market must meet international toy design standards, which depend on the enforcement measures of various countries, such as the ASTM F963 & CPSIA standards of the United States, EN 71 standards of European countries, and TIS 685 standards of Thailand (Issararat, 2018). Important topic that should be careful, such as the materials used should be of quality and not harmful to the users. Toy products must have quality, that is, to maintain and control the quality of the production process effectively. Designers must work with experts and manufacturers to test toy safety, from physical testing, flammability testing, chemical testing.

The designer must pay attention to safety issues in addition to the purpose for fun, and promote development in various areas for children to grow properly. Children are a group of people who are sensitive and vulnerable to potential hazards, and those hazards will have a serious impact on children, as well as the maturity of children who are unable to avoid or assess risks from kids' toys by their own self. Thereby, understanding the safety of designing toys for children aged 0-3 years is a part to help ensure the safety of children to prevent or avoid the dangers that occur to children during play. The design of children's toys must be understood and taken into account in the design regulations of toys or children's products with 4 components related to toy design safety standards: hazard, regulation standards, quality and harmless materials for kids, and the quality of the production process (KritWan, 2014). The inspection of toy production quality uses physical testing and chemical testing procedures for safety verification before use. This is to ensure that children's toys are safe when being played or misused in small kids.

This article will present the importance of studying the necessary and important knowledge for toy design. It sets the conceptual framework for education, namely the development and behavior of children, suitable play methods for children, and the safety of designing toys for children in those ages. This is to analyze and find ways to create the design process for children toys 0-3 years of age effectively.

## 2. Objectives

The objective is to study the factors involved in the design of toys for children aged 0-3 years from development and behavior of children and characteristics of children's toys that are suitable for such ages, including safety in toys. Such study is used as guidelines for design of kids' toys to match the age appropriately.

## 3. Methodology

In the research methodology, the researcher uses a combination of quantitative and qualitative methods for finding answers of the study. Research tools for collecting data are textbooks, documents and research related theories, including interviews, observations with parents and children aged 0-3 years who cooperate in seminars at the Toy Industry Association of Thailand. We can summarize the analysis from information on safety, development behavior of children aged 0-3 years and the desired toy characteristics as follows.



**Fig 2:** Data Collection from interviews and observations with parents and children aged 0-3 years who participated in information part.

### 3.1 Section 1: Data Collection

Good toy design for children aged 0-3 years, the researcher chose tools to collect data, i.e. interview and observation. The informants were 80 children aged 0-3 years, who came to cooperate in seminars of Thai Toy Industry Association by selecting a group of informants in a specific research. The group of 150 parents were divided into 70 males, 80 females, and children aged 0-3 years were divided into 35 males, 45 females for the study of research data. The location for data collection of the observation of children behavior was a seminar room in the Department of International Trade Promotion in Bangkok during August, 2018 with a period of 5 days. Research in the study was conducted as follows.

**Table 1.** Number of parents who have children under supervision in the age range 0-3 years who provide information in research at the Thai Toy Industry Association, classified by gender and age (N =150)

Age group of Samples	Male	Female	Number
21-29	20	20	40
30-39	35	40	75
40 and over	15	20	35
<b>Total</b>	<b>70</b>	<b>80</b>	<b>150</b>

**Table 2.** Number of children aged 0-3 years in data collection in research at the Thai Toy Industry Association, classified by gender and age (N = 80)

Age group of Samples	Male	Female	Number
0-1	5	5	10
2	15	15	30
3	15	25	40
<b>Total</b>	<b>35</b>	<b>45</b>	<b>80</b>

In the interview about understanding of safety, behavioral development of children aged 0-3 years, and the characteristics of toys that are needed, the researcher chose the method of children's behavioral observation in 80 people with in-depth interviews with unstructured interviews to avoid questions that make parents awkward. The interview is a wide range of issues related to development and behavior, including the safety and characteristics of toys that are needed by

parents with children under supervision with the following details.

From the behavior of 80 children aged 0-3 years' observation, and from interviewing parents, can conclude that children have physical development that is growing fast, moving, walking on their own, can choose to catch, drag, hold things around, and behave like exploring things in a wide area. Kids would have anger emotion that can be found frequently because they cannot express themselves in order to get what they want and still cannot communicate to tell their own needs. Rampant behavior such as biting, kicking, and bashing may occur. For safety and toy characteristics that parents worry about are sharp toys and the size of the toy parts which may cause the kids to become choked, stick to the neck, and toys that are not standard for production.

In addition, it was found that the development and behavior of children, they can smile and make a sound, can stand and start walking. Children can start using their eyes to watch and hands to catch things, can communicate by trying to practice speaking and can understand simple words from parents and other people around them. However, children are still afraid of strangers and new places, and are still addicted to people and things. In terms of safety that we should be careful, children will like to pick up items that are shaped and colorful and have a squeezing, biting behavior, which is highly dangerous when children take them into the mouths. Types of toys that children ages 0-3 years are interested in are those with basic geometry that can be created into various shapes that are catchable, including toys that have a cartoon-animal appearance and have languages, numbers, sounds. Data collection will be recorded in electronic tools: digital cameras for recording and portable computers.

Each child has different development and behavior. How well the child will develop depends on the parenting and the promotion of all aspects of development in each age and temperament of the child. Thus, the design of good toys for kids ages 0-3 years is necessary to understand the development and behavior of children in such ages. In addition, we need to know the type of children's toys that are suitable for such ages, including playing safety in order to develop children to grow with quality.

### 3.2 Section 2: The process of design of toys for kids aged 0-3 years

Based on the results of interviews and observations, the researcher synthesized the issues of factors a research on the factors of good toy design for kids aged 0-3 years, it was found that the research process on the development of children's behavior and types of children's toys, including safety are the factors in the design of toys. The researcher chose the concept of Human-Centered Design [4] as a way to analyze the design of good toys. Such concepts were used to create the research and design process for developing children's toys during this age.

Development and behavior of children, safety at all stages of the problem will be studied how to solve problems at each stage from observing that problem in various contexts, until it can be concluded in the design and conceptualization which will be proven in problem solving, development of problem solving, and can be modified. Observation, data collection must be done to improve or solve the problem better and to create suitable toy models for kids aged 0-3 years with the process stages as follows.

**Table 3.** Study stages for designing toys for children ages 0-3 years with the concept of Human-Centered Design Process

Human-Centered Design Process		
INTERVIEW AND OBSERVE	Actually go to your end users and find out what they need	Characteristics of suitable toys for development and behavior of children aged 0-3 years and safety considerations in playing
IDEATE	Take feedback from user observation and come up with some ideas (brainstorm, organize themes, etc.)	Toys enhancing imagination and playing methods that are consistent with physical and temperamental development, including safety for kids aged 0-3 years
PROTOTYPE	Build usable versions quickly and test them out	Create toy sets with playing methods to enhance development and behavior, including safety in playing for kids aged 0-3 years.
ITERATE	Revise until you get something that works	Adjustment of problems from improvements and suggestions for the development of toys for kids aged 0-3 years

### 3.3 Section 3: Experts' Opinions




From data collection of parents and children aged 0-3 years, we used the concept of Human-Centered Design for designing toys for kids. The researcher used the information from interviews and observations to conclude a way to design toys by focusing groups with 9 experts who are representatives of toy designers from the Toy Industry Association of Thailand to find the results of the research. Experts have experience in toy design in Thailand for 10 years. They are the representatives of PlanToys Thailand, BLUE RIBBON MARKETING Co., Ltd, and MANA MAMA Co., Ltd. The researcher used electronic media tools such as cameras, voice recorders from interviews in analyzing the results of insights from the focusing group of experts. Questions are appropriate and relevant to the research topic. In the opinion or attitude towards the factors in the design of toys for kids aged 0-3 years, questions will be the forms of interaction allowing participants with the opportunity to talk and express opinions independently between researcher or participants. At the same time, the researcher recorded the conversation, and presented 3 sets of toys that were originally designed from data collection to experts. The results of the focusing group can be summarized as follows.

In designing toys for children aged 0-3 years, we should consider the behavior and development of children in each age range. The toy models should have creative play methods and enhance ergonomics in the children's proper movement. The results of the playing method should be consistent with the behavior and development, such as how the play can help the development of the children. The research process should have an understanding of toy safety standards: EN71, TIS, ASTM (Issararat, 2018), and must have knowledge of new situations. Regarding the current toy testing standards, we can choose the materials for the production of toys appropriately. Design of toys must be able to appropriately test the prototype products in the safety standards. From the conclusion of the focusing group of 9 experts who are representatives of toy companies from the Toy Industry Association of Thailand, we can explain the 3 factors in the design of toys for kids as follows.



**Fig 3:** Focusing group with toy designer representatives from the Toy Industry Association of Thailand for information synthesis and toy model summarization for kids aged 0-3 years.

**Table 4.** Play types of toys for kids aged 0-3 years from studying the 3 factors, type 1, type 2, type 3, and suggestion, improvement summarization from 9 experts.

Type	Image of Toys	Types of Play	Suggestions and Improvements from Experts
1		Method of play that combines the kids' physical movement with rhythm and music through various animal characters.	The type of play is creative, but should be careful about the electrical structure of the sound system and should have warning signs for playing.
2		Toys that allow children to use the small muscles by using balls and other running along obstacles would help kids practice thinking and solving problems in many ways.	The play is suitable for the age of the child, however, the ball and other small components may be brought into the mouth and caught in the throat and choked.
3		The role play is to enhance the kids' imagination as a navigator, development of children, but the with a nut or screw and rope for devices are sharp and dangerous for them to adjust to the movement of children. various devices in the boat.	The type of play is consistent with the kids' imagination, but the with a nut or screw and rope for devices are sharp and dangerous for them to adjust to the movement of children.

**Table 5.** The results of Mean and SD of experts and designers' opinions levels from the Toy Industry Association of Thailand towards toy in types 1, type 2, type 3, are as follows.

Topics	Evaluation Lists	Type 1		Type 2		Type 3	
		$\bar{x}$ (n9)	SD.	$\bar{x}$ (n9)	SD.	$\bar{x}$ (n9)	SD.
Topic of Development and Behavior	1. Consistent with the development of children	4.16	0.38	3.26	0.66	3.67	0.56
	2. Consistent with the ergonomics of children	4.43	0.51	3.75	0.82	4.27	0.46
	3. Appropriate to the temperament of the children	4.14	0.44	3.45	0.67	3.46	0.64
Topic of Suitability of Playing	1. Playing Methods of the Products	4.34	0.56	3.08	0.84	4.20	0.46
	2. Suitable for the Age of Children	4.15	0.34	3.37	0.46	4.00	0.00
	3. Be Creative.	4.01	1.00	3.01	0.96	3.91	0.35
Topic of Safety	1. Safety of Materials Used for Production	4.10	0.39	3.92	0.36	3.33	0.73
	2. Toy Testing Standards	4.11	0.40	3.12	0.70	3.34	0.75
	3. Production Quality	3.95	0.35	3.03	0.86	3.33	0.77
<b>Mean Total</b>		<b>4.15</b>	<b>0.48</b>	<b>3.33</b>	<b>0.70</b>	<b>3.72</b>	<b>0.52</b>

From the study and analysis of information about the group of informants and suggestions from experts, therefore, we can develop the toy sets by applying type 1 to improve according to such data and can design toys that are caused by factors in design of good toys for kids aged 0-3 years as follows.





**Fig 4:** Toys from the educational process of design of good toys for kids aged 0-3 years.  
**Source:** The Author

Toy types for kids aged 0-3 years designed from the study of 3 factors were analyzed and collected data from parents and children who participated in the research study by children's development and behavior, suitable toy types for children, and safety in toy design. The study of such factors is used together with the concept of Human-Centered Design Process, so it can design suitable toys for kids aged 0-3 years. Presentation piece by the board game model which is a way of playing that children can play in groups or single. Toys are able to enhance children in all aspects, including physical, intellectual, social and emotional development and behavior. In addition, they also advocate the development of children's creativity with rhythm and music. Children will learn and have fun from playing methods that combine the physical movement of children with rhythm and music through various animal characters that they are well familiar with.

The method of play begins from placing a circular board made of soft linen material with graphic pattern of the forest. Then place the game board on the floor or other plains. After that, turn the red switch on the box to allow the sound sensor to work. Choose a wild animal cartoon character and places in the forest that are interested, throw wild animals into the ground on the board, the music will ring in different rhythms. The animal characters will jump and walk until they get the center of gravity, the same way as the rocking doll. During the time when the animal characters walk around, the music will switch according to the location where the animal character jumps. It can be played by many people. This toy helps the social development from playing together and the size of the toy to be suitable for their ergonomics. Also, it will be a training to create imagination from the rhythm of music creative for children.

#### 3.4 Section 4: Analysis of the data of factors in the design of good toys for children aged 0-3 years

From the sets of toys that were designed and developed for kids aged 0-3 years, focusing on development and behavior, playing methods, and safety with 16 children who played sample toys from the Toy Industry Association of Thailand in 2 times of the 4-week trial with 90 minutes/time, the results of the play can explain the satisfaction of the parents who provide information from the children's play. Parents will evaluate after each child's play to score the level of satisfaction of the children from the evaluation form of the research and interviews with the children to find the level of satisfaction in the toys. The results of the analysis can be summarized as follows.

**Table 6.** Results of the satisfaction evaluation of parents with kids aged 0-3 years before the testing and after testing in playing the toys from the factors in the design of toys for 150 samples of kids aged 0-3 years. Data analysis conducted by t-test.

The satisfaction levels of parents with children aged 0-3 years on research toys								
No.	Factors in design of toys for kids aged 0-3 years	Before trial			Before trial			t
		$\bar{x}$	SD	Interpretation	$\bar{x}$	SD	Interpretation	
1	Children Physical Development	3.42	0.71	Moderate	4.39	0.44	Good	21.300*
2	Intellectual Promotion	3.63	0.48	Good	4.28	0.44	Good	22.223*
3	Social Learning	3.37	0.55	Moderate	4.26	0.35	Good	22.330*
4	Emotional Development	3.56	0.48	Good	4.08	0.38	Good	21.266*
5	Types of Play	3.32	0.64	Moderate	4.04	0.38	Good	18.678*
6	Suitable for Children's Ages	3.61	0.48	Good	3.97	0.36	Good	15.573*
7	Quality Toys	3.09	0.79	Moderate	4.08	0.31	Good	21.942*
8	Material Safety	3.28	0.81	Moderate	4.31	0.49	Good	21.787*

From Table 6, it was found that the results of the satisfaction evaluation of parents of kids aged 0-3 years before testing and after testing on toys from research were significantly different at 0.05 level in all aspects.

**Table 7.** The overall evaluation of the satisfaction of the parents of 150 kids aged 0-3 years toward the toys from the research before testing after testing. Data analysis conducted by t-test

Testing	N	$\bar{x}$	S.D.	t	df	P
Before Testing	150	3.41	0.61	20.637	33	0.000
After Testing	150	4.17	0.39			

\* P < 0.05

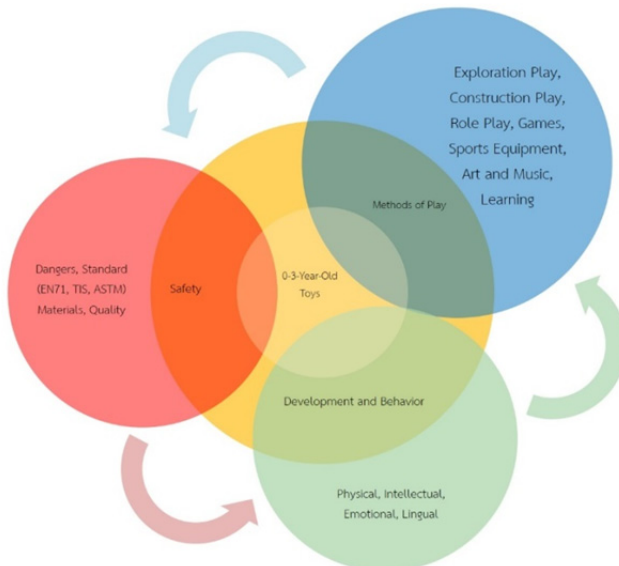
#### 4. Discussions

The study of factors in design of good toys for kids aged 0-3 years has set the guidelines for research to be consistent with the purpose of the study, namely, to study the factors that are involved in the design of children's toys from the development and behavior of children and the types of toys that are suitable for age, including safety in toys. Such study has been used as guidelines for designing children's toys to fit the age range appropriately.

The results of the parents of 150 kids aged 0-3 years who participated in the training and cooperation in research data at the Toy Industry Association of Thailand, 80 people were experimenting with playing sets of toy from a study of the factors in design of toys for kids in those ages, the results showed that the level of satisfaction was at a good level with the overall average of all aspects ( $\bar{x} = 4.17$ ,  $SD = 0.39$ ) when compared with the sample toys from the Toy Industry Association of Thailand, which were satisfied at a moderate level with the average value ( $\bar{x} = 3.41$ ,  $SD = 0.61$ ). Such satisfaction results were evaluated by parents of children from observations, interviews, talking to children related to factors in design of good toys for kids aged 0-3 years. When the parents evaluated the development and behavior, play types and safety, the criteria for questionnaires will be indicators of each sample of each child after playing research toys.

From the study, it was found that the satisfaction of parents of kids with toys towards research work was at a good level in all aspects. This may be because the kids' behavior playing the original toys was familiar, therefore expressing the development and behavior of the child to the parents is normal. When children have sets of toys from research that has been studied from development and behavior, playing types and safety with new ways of playing, thus making children fun and able to play by themselves. Such results are consistent with the personality development theory of Erikson (KritWan, 2014), who emphasized the importance of early childhood which is the age of learning of new and exciting environment for kids. Personality can develop well or not, it depends on how much each child's age has experienced what satisfies in various developmental stages. If the children are responding to what they are satisfied with during that age, the children will develop

good and appropriate personality. Development of children related to toys of research in 2 stages according to the age range of children: 1) Stage of trust or lack of trust, age from birth to 1 year. At this stage, the children will develop a sense of acceptance and be able to build trust in others. Parents' rearing methods will result in a children's personality, resulting in a feeling of trust in the environment and people. If the children are not in good nurture, they will often develop with concealed, distrustful and pessimistic personality. There are the methods in playing research's toys to enhance the social development of children, because playing in groups causes trust with other children and can adjust social development effectively. 2) Self-controlling or suspicious/embarrassing stage in the age range of 2-3 years. Children of this age begin in learning to help themselves, be able to control themselves and the environment. Children will be able to perform simple and appropriate tasks to accomplish by their own selves. The sizes of toys are suitable for ergonomics and small muscles of the children, making children easy to control objects and toy parts, and affecting development according to the age of 0-3 years. The play methods can also make the children perform creatively, allowing their emotional behavior by practicing imagination during play with fun, resulting in the children's emotions being developed to the good ways. Apart from the development and behavior, play types, toys also have safety features for children because the materials used are quality and harmless for kids. The toy sizes are designed from the study of the safety of toys. In addition to consistency with the theory, there is another study that can support the results of the study: Florence and Olufunmilayo (2013) that studied the concept of growth in childhood and cognitive development. This study focused on the process of children's growth and the process of developing understanding from the psychology concept of Piaget from the study on the understanding of the growth and development processes of children through actions and behavior. The results of such study are consistent with this study on the development of children expressed by behavior. It is a children's play characteristic that is an indicator of the development direction of the children because the toys are expression of all aspects of the children. Therefore, the growth and development process of the kids can be improved, depending on the parenting method and the toy which are an expression of their development and behavior. The results of this study can create a link of good toy design factors for children aged 0-3 years as shown in the figure.



**Fig 5:** The relationship between the 3 factors in design of good toys for kids aged 0-3 years  
**Source:** The Author

## 5. Conclusion

The study can summarize the guidelines for designing toys for such age range, consisting of 3 factors: development and behavior, methods of play, and safety. These 3 factors are linked to the design of children's toys during the age of 0-3 years: knowledge of development and behavior of children, which helps in physical, intellectual, social and emotional, including lingual development of children. Development and behavior of children is linked to the types of toys because it is consistent with the physical development of children by ages. For example, types of play that encourages movement and can be chosen to assemble objects of various shapes, resulting in the development of small muscles that are suitable for the children's body. Toy types with music, shapes, colors will help create imagination and learning, making children feel fun to play. Consequently, the toys are like the tools that express all aspects of the children and affect the development of behavior in their every aspect. Nevertheless, it is useless if the toys are unsafe because the children are a group of people who are sensitive and vulnerable to various dangers, it thus has serious impacts on the children's body and causes problems in development and behavior. As a result, understanding the safety of designing toys for kids aged 0-3 years could help ensure the safety of children to prevent or avoid the occurrence of dangers in children during play. The importance of these 3 factors is therefore an indication of the relationship of the toy components for kids, which would effectively lead to the process of designing good toys for kids aged 0-3 years.

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