

Research and Design of Home Products for Multi-Child Families

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Abstract. This paper takes the influencing factors of multi-child family relationship as the entry point, targets home product design in two-child families through preliminary theoretical research. This paper analyzes the existing types of products related to multi-child families, summarizes the pain points and proposes product solutions. The product is designed to apply to multi-child families, where children and parents can have a coexistence space and promote family harmony.

Keywords. Multi-child family, parent-child relationship, product design, interaction

1. Introduction

The evolution of China's fertility policy can be divided into four stages, as shown in Figure 1:

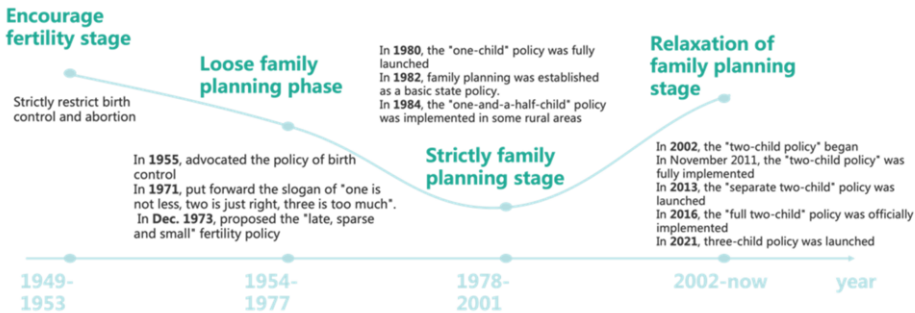


Figure 1. Stages of the evolution of China's fertility policy.

Most families are currently in the stage of two-child families and evolving towards three-child families.

The purpose of this project research is to provide ordinary families with two children to live a better life through product design based on the original quality of life. Also, to truly increase the possibility of family interaction with products, and to reduce the space burden for families due to the arrival of two children with the structure of products. The group hopes to provide a comfortable coexistence environment for family members

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through product design, to achieve the purpose of parent-child interaction and efficient use of space.

2. User Research

2.1 Family structure analysis and characteristics

The types of family structures currently existing in China are divided into six types, as shown in Table 1.

Table 1. Family Structure Type		
Family Structure Type	Introduction Of Members	Features
Nuclear Family	· A couple · Their unmarried children (whether related or not).	· Small number · Simple structure · Easy to communicate
Stem Family	· Two or more generations of couples (1couple / per Gen).	· Have a primary center of power and activity · Also a secondary center exists
Joint Family	· Parents · Married/unmarried children, · Grandchildren (Other Gen).	· Many people · Complex structure · One main center of power and activity and several sub-centers
Single Parent Families	· Only the father (or mother) · Unmarried children.	· May have an unhealthy psychological impact on the child.
Reconstituted Family	· A couple has been through a marriage · May have one or more children.	· Large number and complex structure.
DINK Family	· A childless family consisting of two people in a couple.	· Small number · Simple structure.

There are five trends in family type changes: Miniaturization, Diversification, empty nest, Mobility, and Separation.

2.2 Psychological situation of children in multi-child families

2.2.1 The main reasons affecting the psychological problems of two children

The factors affecting sibling relationships are multifaceted. The main reasons affecting psychological problems investigated in this study are divided into individual factors, two-child age difference factors, and family-related factors.

Regarding individual factors, domestic scholars found that sibling relationship is correlated with individual depression, social anxiety, loneliness, empathy, and gender[1]. Among the parental factors there is a situation where parents devote more time and

energy to care and pay attention to the second child, neglecting the care and companionship of the older child. This phenomenon creating unequal treatment of the two children. In the older child aspect, some of them feel uncomfortable with the change of their role and think that the arrival of "younger siblings" has taken away their parents' love from them[2].

In terms of the age difference between the two children, the survey found that sibling acceptance was highest when the age difference between the two children was between 4 and 8 years old. And as the age of the older child increases, the intimacy and positive feelings between the two children also gradually increase. However, when the age difference is too large (above 8 years) or too small (below 3 years), it is not conducive to sibling acceptance.

In terms of family-related aspects, studies have shown that family-related factors such as parents' marital status, education, family conditions, family atmosphere, number of residents, first-born children's parent-child attachment level, and parenting style have an impact on sibling relationships[3].

2.2.2 Manifestation of the child's psychological problems

Due to the change of family members, the most affected are the older children. The family structure was fixed after the birth of the second child, and the older child's problems were more pronounced because the second child was newly born and had weaker perceptual and emotional expression skills.

Emotionally, older children become irritable, children drop things, misbehave at school. Emotionally, young children become more possessive and sensitive, even jealous. Also, children will compete for toys and things, or destroy each other's belongings.

Children with two or more children show psychological problems that tend to be "bullying", deliberately showing off, deliberately attracting their parents' attention through conflicts between themselves and their older children, competing for more favor, being more selfish in character and lacking a sense of sharing[4].





2.3 Factors that promote harmonious family relationships

The first essential thing to promote harmonious family relationships is the mutual companionship among family members, especially for the elder one. For the arrival of the second child, the change of family members makes it difficult for the older child to accept it for a while. It is possible to involve all family members and provide a common place for family activities, so that both children and parents can learn and play together.

This study found that most of the reasons why only children want younger siblings are peer needs, but there are various reasons for opposition. Firstly, they are afraid that their parents' love for them will be shared, and they are worried that the second child will take away the love and economic support; secondly, they are influenced by the media and relatives and neighbors, etc., and have a negative impression of the second child[5].

3. Research and design of household products for multi-child families

This study investigates the existing products and points out the core functions, styling features, also advantages and disadvantages of the products. The following competing products were summarized as shown in Table 2.

Table 2. Benchmark				
Products	Users	Core Functions	Features	SWOT
	3–16 year-old children	Study zone: the product is a study table and chair, providing study space for two people. Storage zone: the table structure effectively stores school supplies and sundries	The overall form is regular, the functional partition is reasonable and ergonomic.	Pros: reasonable partitioning, focus on ergonomics Cons: single function
	Children and parents	Study zone: the product structure allows for reading, learning and other functions. Storage zone: storage of clerks, toys and other miscellaneous items.	Simple lines, smooth and rounded edges of the product. No extra corners and dangerous folding structure.	Pros: clever structure, ample storage space Cons: single function, lack of ergonomic considerations
	Children in multi-child families	Rest zone: the theme of the product is the upper and lower beds, which is convenient for children of multi-child families to sleep. Play zone: side slides enhance certain fun.	Triangular mechanics structure frame is solid and strong load-bearing capacity. Thickened iron wrapped regular frame.	Pros: stable structure, interesting Cons: single function, too large volume
	1–8 year-old children	Play zone: the theme of the product is a slide, shape and structure with a certain degree of fun.	Large space, multi-functional. The overall edges are smooth and rounded, and the structure is simple and solid.	Pros: interesting Cons: single function, too large volume

Based on the above research, the team analyzed and distilled the design elements and refined the core elements for the characteristics of multi-child families, as shown in Figure 2.

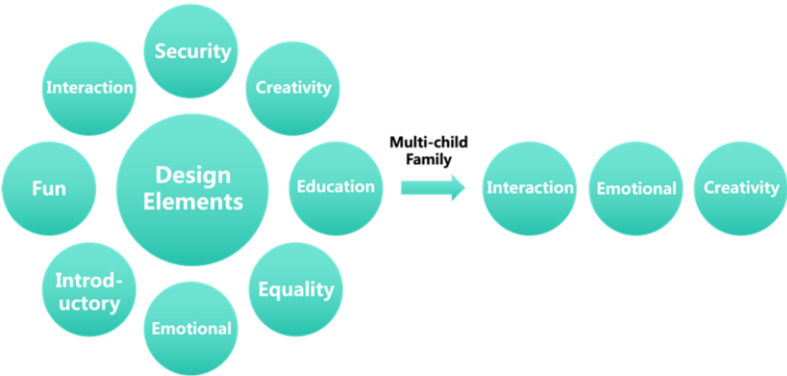


Figure 2. Design elements.

The product of multi-child family focus on interactivity, multi-functionality and sustainability. However, there are many products with large floor space but simple functions. Considering the compact living environment of multi-child families, more

functions should be integrated into the products, but not for the sake of integration. The purpose of this project is to increase the possibility of family interaction through product design, and to reduce the space burden brought by the arrival of two children through the structure of the product. It is hoped that it can provide a comfortable coexistence environment for family members and achieve the purpose of parent-child interaction and efficient use of space for multi-child families.

4. Design scheme and realization

4.1 Design scheme

After benchmarking users and conducting in-depth interviews with them to decide design solutions, the final concept is to design a product which combine children's daily entertainment and study. It not only saves family space, but also allows every family member to participate. The combination of slides, desk and chairs can increase the interaction and communication between parents and children, thus enhancing the harmonious family relationship.

The research team deepened the design for a collaborative product: the multifunctional slide - allowing parents and children to work and play together.

The study envisioned a "multi-functional slide", which combines a desk, chairs and a slide, with seating areas at different heights to accommodate the entire family. The structure can be placed both indoors and outdoors. The design intended to allow members of a multi-child family to all sit together to learn, play, communicate and interact. Of course, this can be extended to other activities as well, especially in the case of home study.

The following are the design sketch derivation process and the modeling rendering of the final design:



Figure 3. Final Product.

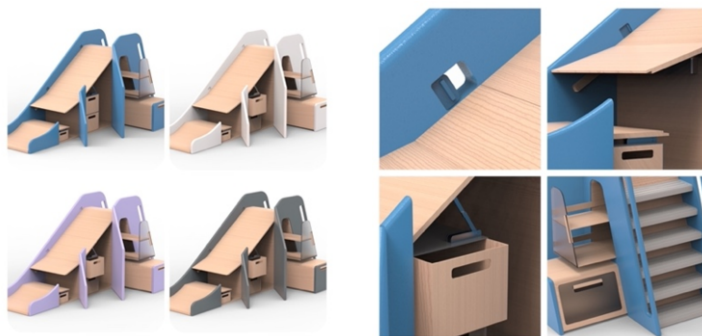


Figure 4. Color Matching and Structural Details

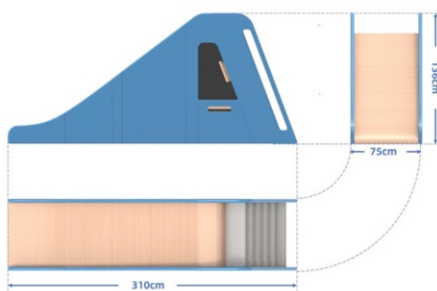


Figure 5. Dimensional drawings

4.2 Significance of the project research

At the level of innovative significance, the research have completed a creative home model product with interactive attributes. This innovative design combines children's daily entertainment and learning. It not only saves family space, but also allows every family member to participate. The combination of slide, desk and chairs can increase the interaction and communication between parents and children, thus enhancing the harmonious family relationship.

In terms of practical significance, the research team designed the product: multi-functional slide - allowing parents and children to have more chances to spend time together. This product is a multi-child home product that integrates a desk, chairs and a slide to accommodate the whole family in different height seating areas. The structure can be placed indoors or outdoors.

5. Conclusion

In this paper, through the study of the physiological and psychological state and relationship gap between two children in the two-child family, we propose a children's home product design that is in line with the multi-child family.

Facing the new family model in the future, children furniture should pay more attention to the development of the relationship between family members, focus on the interaction of family members, and promote family harmony. It is hoped that multi-child

families can raise the awareness of children's physical and mental health, also the interaction of family to live a better life.

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