

# Human Factors Design Research with Persona for Kids Furniture in Shanghai Middle-Class Family

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**Abstract.** There is a huge market for Chinese kids furniture, which, however, is still designed on the level of traditional Ergonomics. The paper, targeted at Shanghai middle-class family, analyzes the correlation between the needs, purpose, behavior and viewpoints of multi-users, based on the data collected through Ethnography. With many factors such as family structure, environmental factor and educational notion taken into account, it constructs user segmentation of multi-users' kids furniture in terms of persona and accordingly gives suggestions on Human Factors Design of kids furniture.

**Keywords:** Persona, Kids furniture, Middle-class family, User research.

## 1 Introduction

It is reported that there are 300 million children under 16 in China, which accounts for one fourth of the whole population of China. In China the children of 40% families have their own room equipped with kids furniture and 46% families have the desire to buy kids furniture. China's kids furniture trade develops so quickly that it takes only 10 years for its market share to rise from zero to one tenth and so it creates a great opportunity for business and design prospect [1].

Now the human factors design of kids furniture in China is still on the stage of traditional Ergonomics focused on product safety and human body size, and hence cannot show the real complex market in a scientific way. The author of the paper hopes to analyze the research of Human Factors Design of kids furniture and ultimately constructs user segmentation and accordingly gives suggestions on Human Factors Design of China's kids furniture in terms of persona. The data employed for the present research was collected through Ethnography and analyzed through clustering analysis.

Considering such factors as Chinese cultures, purchasing power and the fact that the consumers of brand kids furniture are mainly from big cities, the research takes middle-class families in Shanghai as subjects.

## 2 Methodology and Researching Process

Alan Cooper first formally put forward the method of designing in terms of Persona in 1999. Currently the method is mainly applied in the development field of internet

products in China [2]. So far there has been no tentative application of the method in furniture designing field.

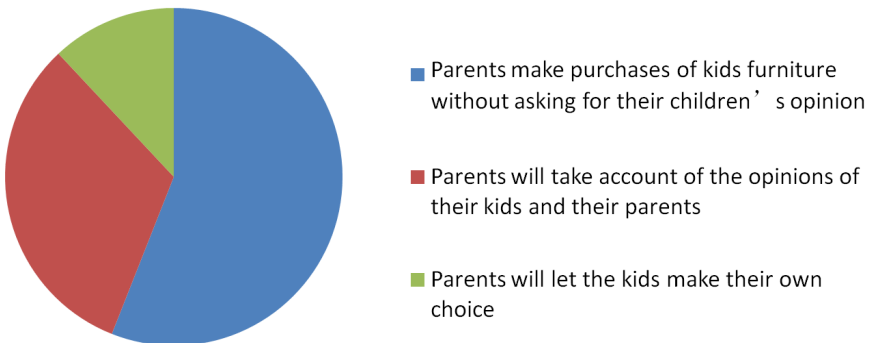
This research is divided into three steps: desktop research, ethnographic research and design analysis.

## 2.1 Desktop Research

Now the Human Factors Design of kids furniture in China mainly includes: physical sizes for different ages, safety for children, children's color cognitive ability, furniture decoration, environmental protection and interest, etc. This kind of designing notion results in the serious homogenization of Kids furniture trade. Products are broadly grouped according to different furniture materials, for different ages or genders of children. And this kind of design is just the application of traditional Ergonomics [3].

Many studies, however, have shown that the research into the holistic family environment and the concept of family education of children has been playing a significant role in children's physical and mental development. The psychiatrist K. Menninger (1945) thought: mental health refers to the state in which people can happily adapt to the environment most efficiently and vice versa [4]. The study conducted by Huang Boqing, Hong Junfeng and Xu Qinghong holds that among the environmental factors, home is the main place in which children develop and form their unique character. The crucial few years are spent in the home for the development of children's character and the acquisition of their behavior [5]. And so this generates a need to shift the research into Human Factors Design of kids furniture in China from traditional Ergonomics to the Sociological segmentation of products aimed at different lifestyles and variant educational concepts.

It is reported that the generation structure of Chinese family has changed. 75.2% married grown sons and daughters don't live with their parents in China. Nuclear families (e.g. a family of two generations, that is, father, mother and children) take up the highest proportion while four-generation families merely accounts for 1.9% [6].



**Fig. 1.** Different families purchase kids furniture in different way

A local survey conducted by the magazine Good Housewives in 2011 reported the findings that more than 46% city middle-class nuclear families have nannies [7]. According to the survey, 56% parents make purchases of kids furniture without asking for their children's opinion and 32% parents will take account of the opinions of their kids and their parents, and 12% parents will let the kids make their own choice in the buying of kids furniture [8].

## 2.2 Ethnographic Research

This research took the eight families as subjects with independent children room, those located in six different districts in Shanghai. The subjects were selected in terms of different ages, careers, and family structures in a comprehensive way. The research required the subjects have a residential space of more than 100 m<sup>2</sup>, in which the independent children's room covers more than 9 m<sup>2</sup>. Meanwhile the yearly income of each family of three people is between 150,000 to 300,000 RMB.

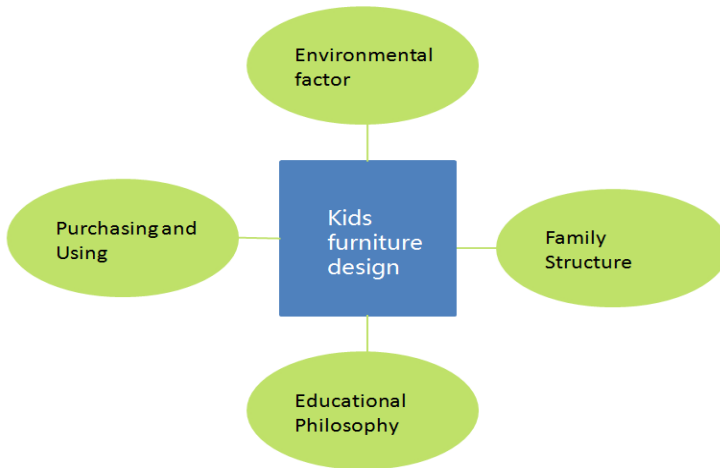
The researcher of the study spent one whole year following up and observing and interviewing the subjects on the spot to learn about their family life. The subjects were invited to take photos of their family life, which should display all the children-related activities and objects in the home, and they were also required to describe the activities in written words. In the meantime, the researcher regularly paid a visit to the families of the subjects, took pictures on the spot, and asked the subjects and their kids to explain the operation process of the written records of their family activities, their attitudes to and opinions about the activities, through which the researcher learned about their way of living and their notions about education.



Fig. 2. Photos taken from 8 Shanghai middle-class families

## 2.3 Design Analysis

Through clustering analysis of a multitude of ethnographic research data, the researcher, collecting the advice from designers and furniture market experts, found that such factors as family environment, family members, family relationship, philosophy of life, education concept, who buy the furniture and who will use the furniture are directly correlated with the data of user groups. Based on the desk research data, the researcher extracted four factors which influence the most:



**Fig. 3.** Four factors for kids furniture design

**Environmental Factor.** All children, particularly those of low age, widely use the other space of their home with the living room most frequently used while the dining room and the bath room the second. In this sense, the design of kids furniture should be involved in the whole home furnishing design. Family size and which room is picked as the children's room will make the Human Factors Design of kids furniture differently.

**Family Structure.** The number of family members and family relation structure usually determine who will take care of children and how they will educate children. Nuclear families with just father, mother and kids still constitute the main family structure. They can consider living with nannies or grandparents, who will, on their behalf, look after the kids. Even for nuclear families, some families are taken charge of by both parents, while others by only one of them.

**Educational Philosophy.** More commonly seen are such traditional educational modes as parents hoping their children will have a bright future, a kind mother and a stern father, or grandparents doting. Yet there has been a gradual increase in pursuit of educating in a democratic, more natural and human way.

**Purchasing and Using.** Generally speaking, the proportion of children who are allowed to involve themselves in making a purchase decision is very low. More involvement of children in making a purchase decision, however, will be the future trend as parents get more education and influence from western democratic notions.

### 3 Persona

Real user behavior and opinions were collected through desktop research and ethnographic research. In the stage of design and analysis, the group in charge of creating persona held assimilation meetings at which the research data were processed through clustering analysis. All the data were tagged and categorized in terms of user

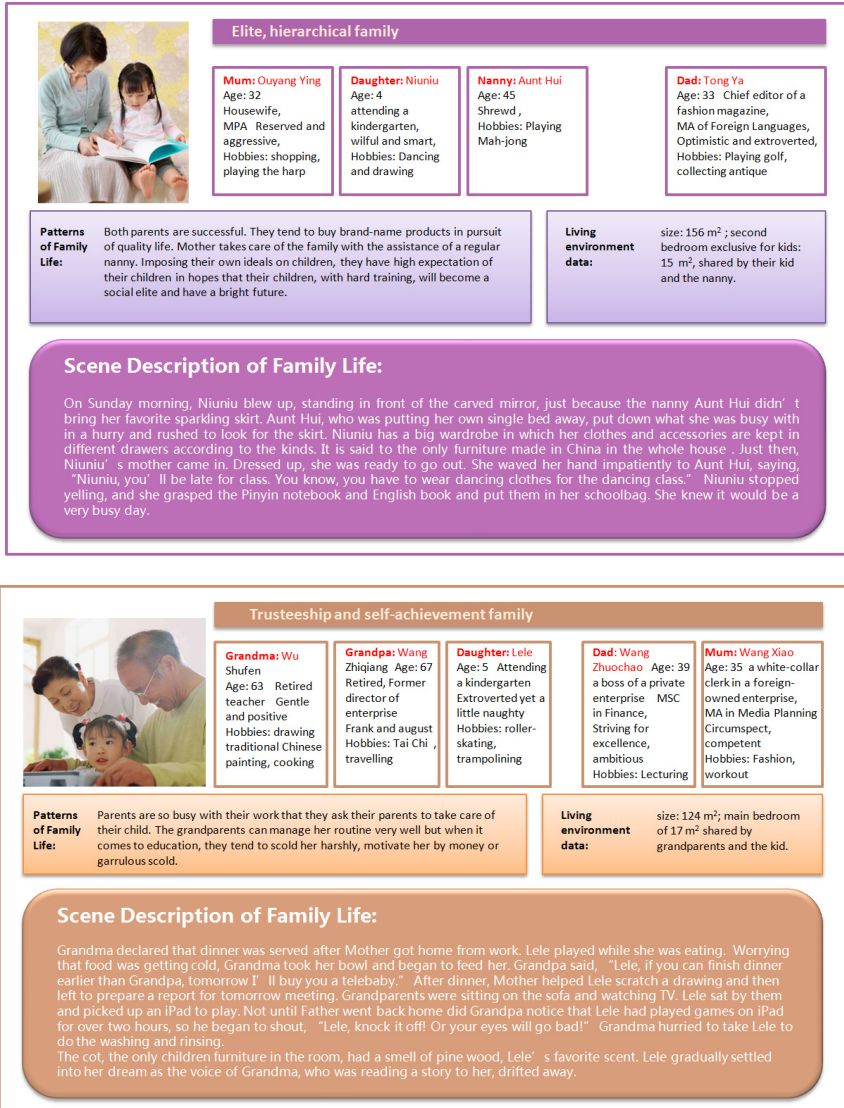


Fig. 4. The descriptions of the persona of the four family types

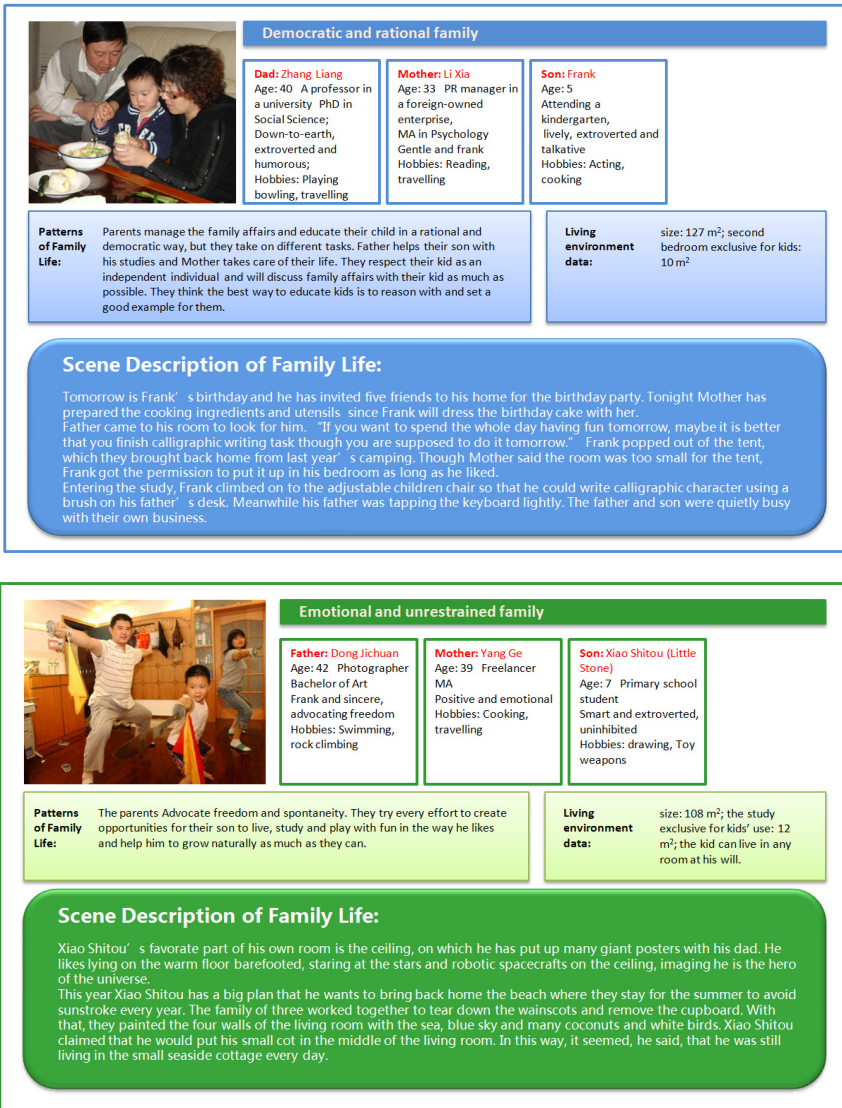


Fig. 4. (Continued)

behavior, opinions, motive and demography. Based on the analysis of the data, four key factors were extracted: environmental factor, family structure, educational philosophy, purchasing and using. According to the matching degree of different factors, the user group with the highest matching degree was classified as a user segmentation with its unique traits retained which are different from those of other user segmentations. The moderation of the persona number considered, four types of family persona were ultimately defined through clustering analysis. Follow-up visits

were made and the users were asked to make an evaluation of the defining persona which was then modified accordingly. Persona was established on the above work. There was a need to write stories about the characters in order to create the persona. The writings included the demographic data of each family member, the setting of primary and secondary roles, introduction about accommodation condition, patterns of family life and the outline of values and educational philosophy. The vivid detailed account of the real situations displayed the using of kids furniture and users' attitude towards it. Family persona identified in this way can serve as a mode for user segmentation of sociological and anthropological significance.

The four family personae generated in this research include: elite, hierarchical family, trusteeship and self-achievement family, democratic and rational family, emotional and unrestrained family.

## **4 Design Guidance**

In the light of family persona, the Human Factors Design guidance will consider as a whole the factors such as environmental factor, family structure, educational philosophy, purchasing and using, and gives suggestions from the following perspectives: purchasing decision maker of kids furniture, the overall home furnishing features, the essentials of kids furniture designing and provides designing demo pictures.

### **4.1 Kids Furniture Design Guidance for Elite, Hierarchical Family**

Children in this kind of family usually have their own room, but the buying and displaying of the furniture are decided on by one of the parents who prefers More classic, vintage and brand-name furniture, highlighting such factors as mental development, hi-tech, health, education and internationalization. The furniture has one function for one piece with a remarkable appearance. The material, with solid wood as the first choice, is selected carefully. Furniture for storage is in a large demand. Kids of low age usually live with a nanny, so the furnishing of children room should include the nanny's furniture.

### **4.2 Kids Furniture Design Guidance for Trusteeship and Self-achievement Family**

The grandparents usually live with their grandchildren in the same room. The parents tend to make the choice of furniture for their kids. They pay more attention to function, favoring low-profile style. Adjustable furniture is the most popular, furniture with multi-functions, like solid wood furniture with high cost-effective, are more favored in the market. Adjustable cots are best –selling and second best-selling are adjustable desks. They prefer Simple, rustic and moderate style to hi-tech and new material.



### 4.3 Kids Furniture Design Guidance for Democratic and Rational Family

Parents work together to decide what furniture to buy and they will buy furniture according to their shopping plan, which not only heeds the matching of furniture with the whole family furnishing but also shows respect for the kid’s preference. Adult furniture in other rooms is also accessible to kids. The design of this kind of furniture is focused on kids’ interests at different age, modular basic function, and the matching of structure and diversifying surface decoration. The decorating style displays eye-catching or fashionable elements for kids, such as hot children TV series or popular children games.

### 4.4 Kids Furniture Design Guidance for Emotional and Unrestrained Family

The family members usually follow their hearts in buying furniture, from adult furniture to kids furniture, which usually do not match each other. Kids in this type of family have the say in buying furniture. The family furnishing displays a blending style without considering the overall uniformity and space functions are unclear. Kids have more freedom to choose where to rest, study or play. So the kids furniture might be moved to anywhere. Remarkable or creative appearances will attract such parents even their functions are similar. As a consequence, kids furniture for this type of family should pay more attention to creativity and imagination, and highlight emotion appeal to kids. And so design for single piece of furniture is more important than for the whole set of furniture. In form design, priority should be given to the elements like representational and interesting image that is liable to catch kids’ attention, or abstract with indefinite functions. Solid wood is preferred to other material while structure should be simple, strong and durable yet not delicate.



Fig. 5. Demo pictures for different Personae



## 5 Conclusion

Traditional Human Factors Design of kids furniture, simply following technological and material change, focuses its main attention on children's physical size and safety. It, as a consequence, gives rise to product homogeneity and fierce market competition. This research, based on ethnographic research, enables designers a full view of the diversity of user groups and the complexity of markets. The user segmentation mode through creating persona allows designers and enterprises to directly perceive users and markets through senses and hence design products with more accuracy. It is also conducive to the strategic positioning of the product purchasing and the way of marketing.

The user data employed for the present research are obtained through ethnography. Though the number of sample cases is limited, more attention has been, in the process of the selection, paid to the integrity and diversity of the data. It makes it possible to obtain quality anthropological and sociological data and hence ensures the building of persona. Meanwhile the research, as a beneficial attempt, will introduce the research methodology of the internet into the traditional business of furniture design and bring new business opportunities for the market competition of kids furniture involved in a price war. With the advent of the information age, further research should be made into users and more cross-field and diversifying studies be done of design to ensure the victory for the enterprise in the future market competition.

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