



ACCESSIBLE PACKAGING DESIGN FOR THE ELDERLY

Liu Miao¹, Teeranop Wangsillapakul² and Pajit Ingsiriwat³

¹ Graduate Student – Master of Fine Arts in Design, Collage of Design, Rangsit University, lmiao467@gmail.com

² Lecturer – Master of Fine Arts in Design, Collage of Design, Rangsit University, tnop@tnop.com

³ Lecturer – Master of Fine Arts in Design, Collage of Design, Rangsit University, pajit948@gmail.com

ABSTRACT

With the growing aging population, the elderly are becoming more prevalent in society. Their physical abilities decline with age, necessitating attention from various fields, especially designers. This paper aims to analyze the current issues in food packaging for the elderly, where some products on the market lack age-appropriate packaging, neglecting the visual and psychological needs of the elderly. The proposed food packaging design strategies intend to enhance information transmission efficiency for elderly-friendly packaging. The research culminates in a detailed series of organic agricultural products and a set of age-friendly food packaging aligned with the physiological and psychological needs of the elderly.

Keywords: Aging, Food packaging, Humanization, Accessibility, Elderly, Aging Society

1. Introduction

The common international view is that a country or region is in an aging society when 10% of the population is over 60 years old or 7% of the population is over 65 years old. The world population has entered a moment of rapid aging, and population aging is likely to become one of the most important social trends of the 21st century.

The UN report on world population aging states that from 2015 to 2030, the number of people over 60 in the world is expected to grow by 56%, from 901 million to 1.4 billion, and by 2050, the global elderly population is expected to more than double from 2015 to nearly 2.1 billion. (Figure 1)

The world's demographic structure is getting "old", while technological development and social progress are continuing to become "new", and the gap between the aging society and the digital society is gradually being reflected in social phenomena. The advent of an aging society is bound to have a huge impact on the consumer market and provide new development opportunities and challenges for the packaging of various products.

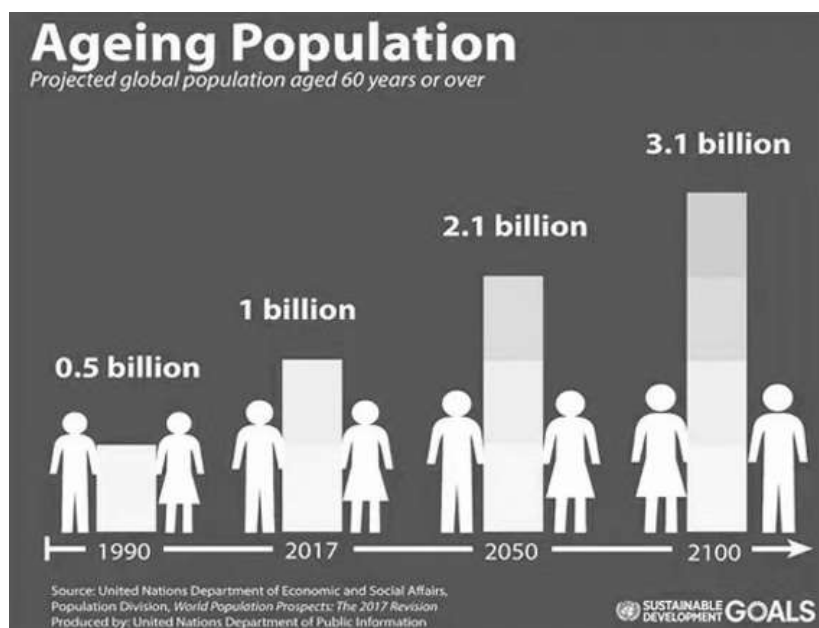
However, some businesses are only focused on the health of the food itself, ignoring the humane design of the elderly food packaging open, and even the elderly open these foods there are certain safety hazards.

Therefore, the aging perspective of the elderly food packaging open need humanized design, to pay more attention to the physiological, psychological and behavioral characteristics of the elderly, pay attention to the elderly food packaging open before, during and after the humanized design, not only to meet the need for the safety of the



food packaging itself, but also to enable the elderly to open the use of the elderly will not be harmed, so as to meet the material and spiritual needs of the elderly consumer groups, to enhance the awareness of the product and loyalty. To enhance the awareness and loyalty of the product.

Figure 1 UN World Population Ageing Report (Picture from the United Nations News, 2017)



Based on the increasingly serious situation of aging in Chinese society, this paper focuses on the existing problems of packaging in the market. It combines the current status of the elderly group and addresses the issues arising from their physiological and psychological degradation. The paper then presents key points for barrier-free packaging design tailored to the needs of the elderly group. The research field of this paper is in China, and its design scope involves planning corresponding solutions based on relevant research results to create a series of age-friendly food packaging for the elderly.

2. Objectives of the study

- (1) Humanization is penetrated into every aspect of the design.
- (2) Fully consider the physiological, psychological and behavioral characteristics of the elderly consumer groups.
- (3) Combine the four common forms of food packaging in the market, namely bag, cup, bottle and filling, and analyze them in depth.
- (4) And research on the humanized design of food packaging for the elderly before, during and after opening.
- (5) To provide some reference basis for the sustainable development of food packaging industry for the elderly.



3. Design research

3.1 Preliminary Survey & Research

Design is about the realization of needs to achieve a high quality and more convenient life.

The current status of the aging society has given rise to age-friendly design, and at the same time has put forward new requirements for design as the society continues to develop. This thesis takes the current aging society as the background, based on the physiological and psychological characteristics of the elderly in the context of social life, and discovers their requirements for the current food packaging design, and explores the issue of age-appropriateness in the field of contemporary food packaging design based on their needs. Based on the spirit of "human-centered" design, we aim to solve the problem of aging appropriateness in contemporary food packaging design to meet the needs of the elderly. (Lynch, 2015)

Ageing is designed for the elderly, according to international regulations, people over 60 years old are identified as elderly, first of all, we must fully understand the characteristics of the elderly in order to do a good job of ageing, we can understand the characteristics of the elderly from two aspects: physiological function and psychological. (Figure 2)

Physiological characteristics:

- 1) Visual characteristics
- 2) Auditory characteristics
- 3) Behavioral Characteristics
- 4) Cognitive characteristics

Declining comprehension: Some digital services are designed by the post-80s and 90s, which are different from the era older users live in. Under the influence of declining memory and comprehension, older users have limited understanding of the new generation culture.

Degradation of memory: the long-term memory ability of the elderly group declines significantly, and logical understanding memory is better than mechanical memory; the memory of the past is deep, but the impression of recent events is blurred; the long-term memory ability of the elderly is not as good as the sensory memory and memory. Therefore, the product information layout should help the elderly to develop fixed behavioral habits and deepen their memory through repeated operations. (Rogers, 2005)

Decreased attention

- 5) Expression characteristics

Physiological language impairment: refers to the physiological degenerative process that occurs after maturity, which includes cognitive aging of the brain, which can degrade the language skills of many older adults, such as difficulties in vocabulary extraction and problems in understanding discourse with difficulty.

Psychological characteristics :

- 1). Decreased sense of security



2). Weak adaptability

Due to the limitations of physiological conditions, such as the decline of short-term memory and the degradation of thinking ability, the elderly are less receptive to new things, and it takes longer to learn and understand a new thing, and their ability to adapt to the social and living environment is weakened. They usually find it difficult to learn the use of new technology products and are reluctant to try them out actively.

3). Loss and low self-esteem

Older people may feel out of touch with the times, feel lonely and empty mentally, and are prone to low self-esteem, often feeling neglected and wanting more care and recognition from family and society.

Based on the analysis of physiological characteristics and psychological characteristics of the elderly, the problems affecting the elderly can be basically divided into six categories, namely, can not see clearly, can not hear clearly, difficult to operate, can not understand, can not explain, unwilling to learn.

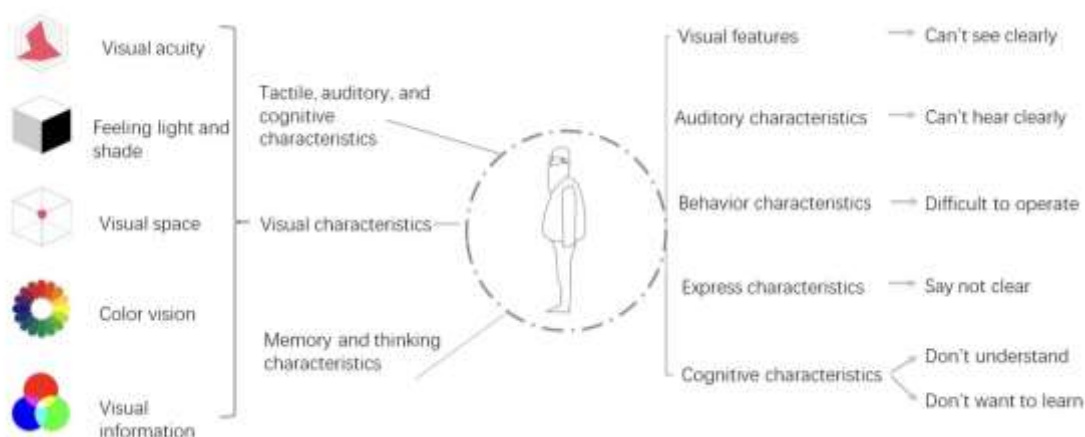


Figure2 The physical features of the elderly (The image is from the author, 2022)

"It's not about people getting older and acting a certain way as a result, it's about the forces that affect them and how those forces are affected by age."

--Matt Wallaert, head of behavioral science at Frog

Older adults are not just older people; like any other population, they are a highly diverse group, and each individual has different characteristics, which leads to different difficulties for each individual in using the product. Most persons over the age of 65 likely are healthier, more active, and mentally better off today, than were those of previous cohorts. (Crews, 2005) The elderly population living in the city, earn a lot of money, so we can design some unique packages for them. From the perspective of practical application, as the elderly are a relatively special consumer group, the requirements of the commodity packaging industry for the aging group also have certain differences, and need to fully reflect the characteristics of the elderly group and the real shopping needs. Usually,



some daily necessities or common goods will only come with a simple instruction manual in the selling process, which has the manufacturing date of the goods and simple descriptive words, but the elderly group can not effectively identify these information, so the commodity packaging design should start from the physiological perspective of the elderly, so that the goods have a more eye-catching reminder function, choose a more beautiful and simple structure type or easy to The design of product packaging should be based on the physiological point of view of the elderly, so that the product has a more eye-catching reminder function, choose more beautiful and simple structure type or easy to recognize the font color.

Food is an indispensable part of people's daily life, and in recent years, the issue of food packaging's suitability has gradually attracted attention. Food packaging conveys food information and plays a role in protecting food, etc. However, some of the current products on the market do not show the suitability of the packaging for the elderly, often ignoring the real needs of the elderly groups visually and psychologically.

3.2 Case research

I found an existing brand. The brand name is Jiushan Farm. With the belief that "the time is right, the place is right", the brand provides elderly consumers with high quality organic products. The Grain Gift Box is their first product on the market and uses a series of strong hand-made illustrations in the main visual of the packaging to convey the brand concept of organic farming. (Figure 3)

The advantage of this package is that the color of the food echoes the color of the package, making it easy to find. The packaging surface is designed with an opening to help seniors find what they want quickly. The disadvantage is that their boxes do not meet the needs of the elderly and are not easy to carry and hold. And they sell the cereals separately.



Figure 3 Jiushan Farm brand series packaging (The image is from the network, 2022)

Then there is the case of the brand, Akikawa Farms, a Japanese brand. Their slogan is "What goes into your mouth must not be wrong." In order to reflect this concept in the package design, the designer used the content



information, which is usually placed on the back of the product, as the main design element and highlighted it on the front of the package. In the logo design, the new brand color "Boutaro Green" was set to recall the first generation of idealized farms of the Boutaro family. As the company strives to create a regional cycle-oriented agricultural model, the team designed a logo featuring the mountains of Yamaguchi Prefecture. The raw speckled pattern came from an existing logo and conforms to the shape of a map of Yamaguchi Prefecture and parts of Fukuoka Prefecture. The design has begun to be reflected in the product's packaging. Akikawa Farms has begun working to reconnect its philosophy of reliable food with today's conscious consumer.

For the rest of the packaging, the design uses the consistency of the mountain range theme. When the products are placed side by side on the shelves, the mountains appear to be lined up, creating a strong visual impression on consumers. On the outer box, an illustration of a farm is used, connected on all four sides. The illustration goes from the pasture to the table, reflecting the slogan "Raise, Make, Eat". (Figure 4)



Figure 4 Akikawa Farm brand series packaging (The image is from the network, 2022)

The following series of packages is a new range of frozen and pre-cooked fish and crustaceans branded by "Ionian Fish" for the Greek market! Drawing inspiration from the long tradition of fishing, and in order to emphasize the richness of fishing in the Ionian Sea and the Gulf of Ambracia, where the product originates from, the packaging uses a "combination of reality and reality". The packaging adopts a "real and imaginary" design approach, with a simple die-cut on each package allowing the consumer to see the quality of the product he has chosen, while the pattern is presented using a linen pattern technique. The almost rough appearance of the pattern responds to the traditional requirements of the brand's craftsmanship. (Figure 5)



Figure 5 Ionian Fish brand series packaging (The image is from the network, 2023)

These are some of the food packaging cases summarized in this article, these cases in different degrees to provide me with a worthy place to learn. At the same time also opened my eyes.

3.3 Question research

Due to the low Internet contact rate of the elderly group, the online questionnaire survey was not taken, and the author conducted offline questionnaire research based on visiting places where the elderly are densely populated, such as parks, squares and supermarkets. (Figure 6) By analyzing the feedback of the questionnaire survey, we learned that people are more concerned about the health and safety issues related to food because they are in the post-epidemic era.



Figure 6 In-depth conversations with seniors at supermarkets and case studies in books



(The image is from the author, 2022)

By analyzing the feedback from the questionnaire survey, we learned that most elderly people still prefer to shop in supermarkets, and food safety is the main factor affecting their shopping, and they usually buy food in supermarkets. (Figure 7) Most of the seniors who participated in the survey emphasized the issue that while price is still important to them, food safety and health are more important at this stage.

Questionnaire Survey (A total of 30 seniors were interviewed.)

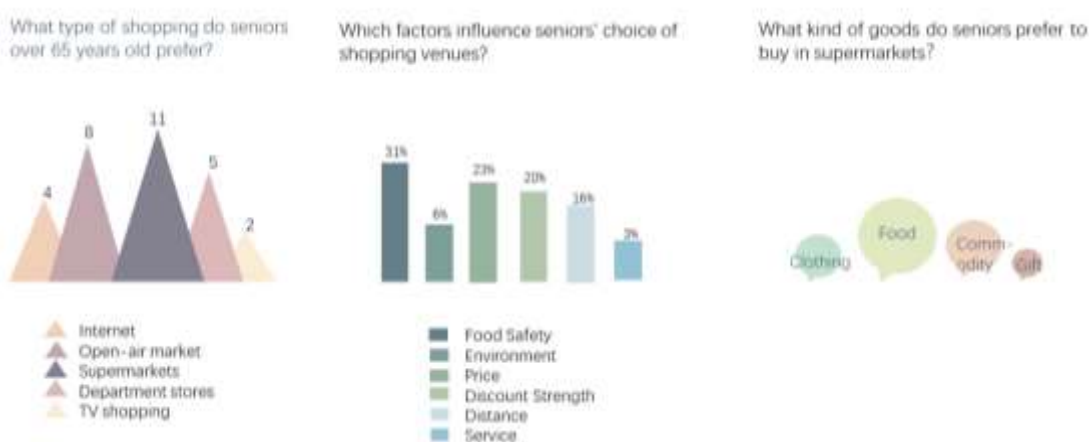


Figure 7 Questionnaire feedback form (The image is from the author, 2022)

Then, we conducted in-depth interviews with two of the older adults to learn more about some of their views on current food packaging. (Figure 8) The purpose of this interview was to gain insight into the real needs and obstacles of the elderly in the supermarket shopping process. The target interviewees were set as local seniors aged 65 years or older, capable of behavior, with medium or higher income levels, and more focused on shopping experience and product quality and safety. The author summarized and refined the information obtained from the interviews.



Figure 8 In-depth Interview Information Summary (The image is from the author, 2022)



3.4 Question summary

Current problems of age-appropriate food packaging

1). Food packaging information is not conducive to the recognition of the elderly

Restricted by physiological functions, the attention and comprehension of the elderly have decreased, and have certain obstacles when reading, many elderly people need to use presbyopia glasses when reading the text. Therefore they usually fail to find the focus for the full-page design, and often need to look at it repeatedly and constantly. At the same time, most elderly people suffer from common chronic diseases, and have their own limitations on the purchase of goods, while the current market food packaging almost no hints for these common chronic diseases, which undoubtedly increases the difficulties of the elderly groups to buy food. (Bou-Mitri, 2020)

2). The aesthetics of food packaging does not meet the interests of the elderly

Due to the special background and upbringing of the elderly in China, they prefer stability, poor acceptance of new things, and prefer conservative and traditional style. Considering the aesthetic interests of the elderly, the packaging design should be as aesthetically balanced as possible between the preferences of the elderly and the objective aesthetics. It is not evident that these design principles are followed whenever accessibility issues are dealt with the older adults or people with disabilities. (Mustaquim, 2015) However, the senior food packaging on the market now is usually just a small modification of the original product packaging, which does not fully meet the aesthetic interests of the elderly.

3). Food packaging does not take care of the experience of the elderly

The usage experience of elderly people is of the most important factor for packaging design. (Buddeejeen, 2018) Older people due to the growth of age, memory function is reduced, the ability to accept new things is poor, in the way of packaging, some new packaging open way for them to become difficult. And the elderly usually have "save up" behavior, therefore, food packaging should especially take into account the function of secondary storage. The choice of materials, the elderly also prefer to be able to second use of environmentally friendly packaging. Now many products on the market are designed to pursue simplicity, the surface will be very smooth, but the elderly due to the degeneration of hand muscles, in picking up these products are easy to fall; glass and other fragile materials will produce dangerous.

To determine the direction of the packaging design, I conducted another interview. Understand that they will often eat grains and cereals due to their bad teeth.

So I went to the supermarket again to investigate the cereal packaging. (Figure 9)

Most cereal packages are too heavy for older people, and they all require hand-carrying, and older people's fingers are not strong enough to grip them firmly enough.



Figure 9 Observe cereals packed in the supermarket and talk to the elderly

(The image is from the author, 2022)

Humanized analysis of the opening of food packaging for the elderly

At present, the more popular food for the elderly on the market, the packaging shape is very different, the choice of materials complex and diverse, which involves the structure of the materials used in the product and the production process, and the way it is opened is also very different. According to the different materials used in food packaging for the elderly, the product packaging open roughly: paper-based materials, plastic-based materials, glass-based materials, metal-based materials, etc., selected from the market the four most common forms of food packaging for the elderly in the market: bagged, cups, bottles and filled, are selected as the object of analysis. (Figure 10)

1) The opening of bagged food packaging

Bagged food usually uses zipper, press type, squeeze cap type and other opening methods.

2) Cup food packaging opening

The opening part of the senior cup type food is also usually designed in the cup lid, usually using cup food special sealing equipment, heat sealing of the container, sealing production materials such as paper, plastic, composite materials.

3) The opening of bottled food packaging

The common bottle packaging in the market mainly includes plastic, glass, ceramic and organic composite materials, etc. The opening methods are mainly screw cap, cork and crown cap, etc. The screw type opening design is more used in plastic materials, and is also one of the most widely used and convenient ways to open.

4) Opening of canned food packaging

Canned foods occupy a large proportion of the senior food market. Such as milk powder, meat loaf, canned food, nuts and other foods are mostly packaged in this way. In order to ensure the smooth opening of canned foods, most of the sealing lids and pull rings are made of metal.

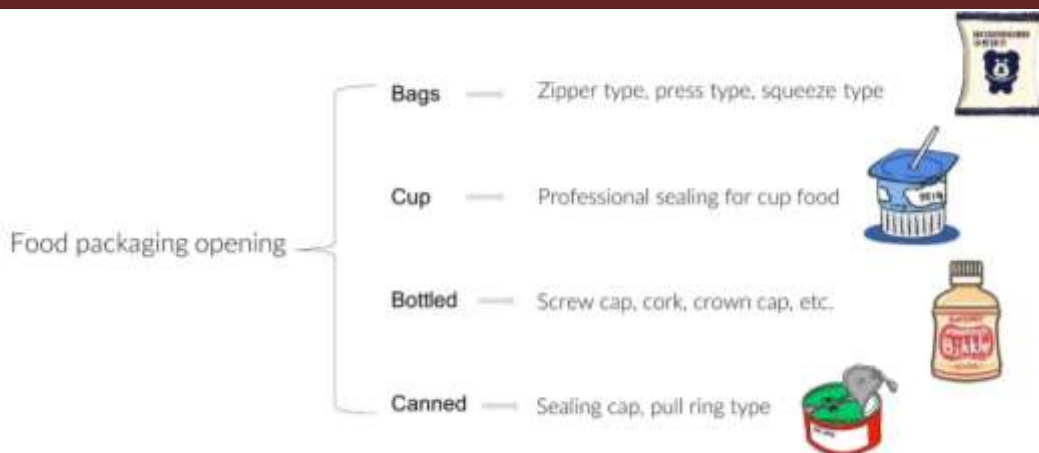


Figure 10 Classification of food packaging according to the different materials

(The image is from the author, 2022)

4. Design process

4.1. Design concept & idea

There are four major categories of design needs for the elderly. The first is physiological needs, including visual, memory, and touch. Then there are service needs, The content is easy to understand. The goal is clear. The security guarantee. And psychological needs value embodiment and always accompany .Finally is material needs, financially support, the elderly population living in the city, earn a lot of money, so we can design some unique packages for them.

Only by studying the internal needs of elderly users can we abandon the limitations and truly review the packaging design from the perspective of elderly users.

Older people should not only eat well, but also eat healthy and match their meals to their bodies. Most of the food packaging designs available in the market for living purposes, such as table salt and rice, are based on human regular use considerations and do not take into account the special characteristics of the elderly population. As seniors living independently, these are necessities. So, I decided my design direction, mixed grains packaging design.

4.2 Propose new product direction

Whole grains provide a wide range of nutrients and phytochemicals that optimize health. (Slavin, 2000) Based on my research, I wanted to create a combination. (Figure 11)According to the nutritional value of each grain to make a combination, divided into different series. The combination of different grains together will bring improvements to the body.



Figure 11 Different combinations of grains (The image is from the network, 2022)

Here is a table from which you can see that different grains are good for the organs. (Table 1)

Table 1 A part of the different grains that are good for different organs

Grain	Brain	Eyes	Heart	Skin	Stomach	Joints	Lungs	Liver
Soybeans					√	√		
Red beans			√					
Black beans		√		√				
Fava beans	√					√		
Buckwheat	√						√	
Purple rice		√						
Sesame	√							
Wheat			√					
Kidney beans			√					
Sorghum								√
Brown rice					√		√	
.....

According to research, grains and cereals are divided into eight parts, which correspond to eight body parts. Eat This one is good for the eyes, and this one is good for the brain, Lungs, heart , liver , skin, stomach, joints.

Seniors should consume 50 to 100 grams of whole grain foods per day. So I think it would be better to make the mixed grains package into smaller portions.

So, I decided to create a box that could be placed in their homes and a display box in the supermarket, as well as some small packages. If a part of the home box is eaten up, you can go to the supermarket to buy some back and



put it in the big box. The large box of servings is 32 bags, the display box has eight, each box has 10 bags, 1 small package of grams is 50 grams.

4.3 Design exploration

There is the first version of the model . (Figure 12) The shape of a person. Advantages are easy to see, find what you want quickly. Disadvantages are the packaging is too cumbersome and not easy to carry.



Figure 12 Pictures of the first version of the model (The image is from the author, 2023)

The second version of the model is a rectangular box. (Figure 13) Advantage is the ability to visually see each box. Disadvantages are the pattern is too medical. The internal structure is not solid.

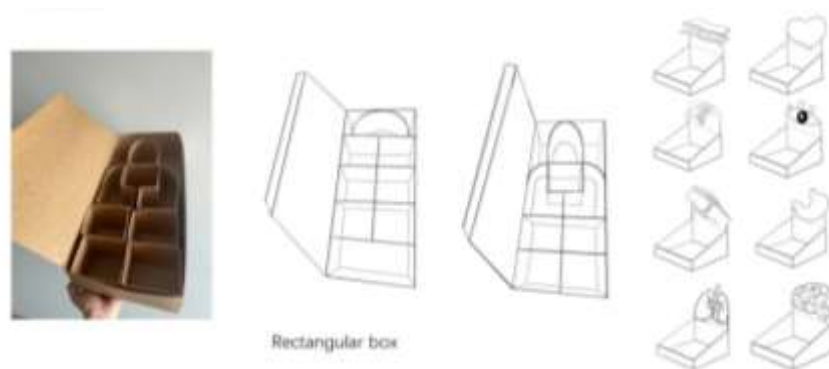


Figure 13 Pictures and sketches of the second version of the model (The image is from the author, 2023)

The third model, which continues the second model. (Figure 14) A carrying handle was added. After testing, this carrying handle is not good.



Figure 14 The third version of the model picture (The image is from the author, 2023)

4.4 Final design

These illustrations of eight parts. (Figure 15) Using different shapes of beans to form the eight parts of the body. The inspiration comes from the traditional Chinese culture, paper cutting. In China, paper cutting is usually used during the Chinese New Year to symbolize good luck and good wishes. Older people are generally fond of it, so I used the element of paper cutting to echo the emotional value of older people.

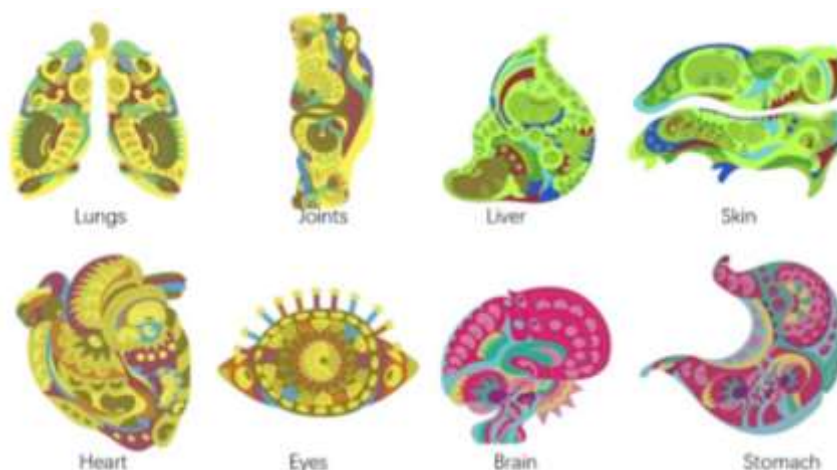


Figure 15 Eight parts of the illustrations (The image is from the author, 2023)

Here is the logo design and font design. (Figure 16) The logo uses the element of leaf to symbolize green health and environmental protection. It is also the Shan of the brand name Jiushan. The final presentation is an image of an old man.



Figure 16 Logo design and font design patterns (The image is from the author, 2023)

Next is the plan view of the package. (Figure 17)

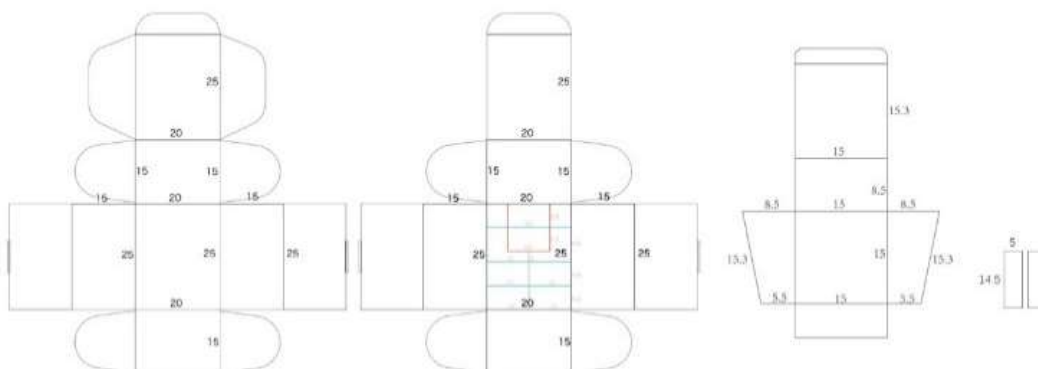


Figure 17 The plane expansion of each package (The image is from the author, 2023)

This diagram is the layout of the large package, the display box, and the small package . (Figure 18)

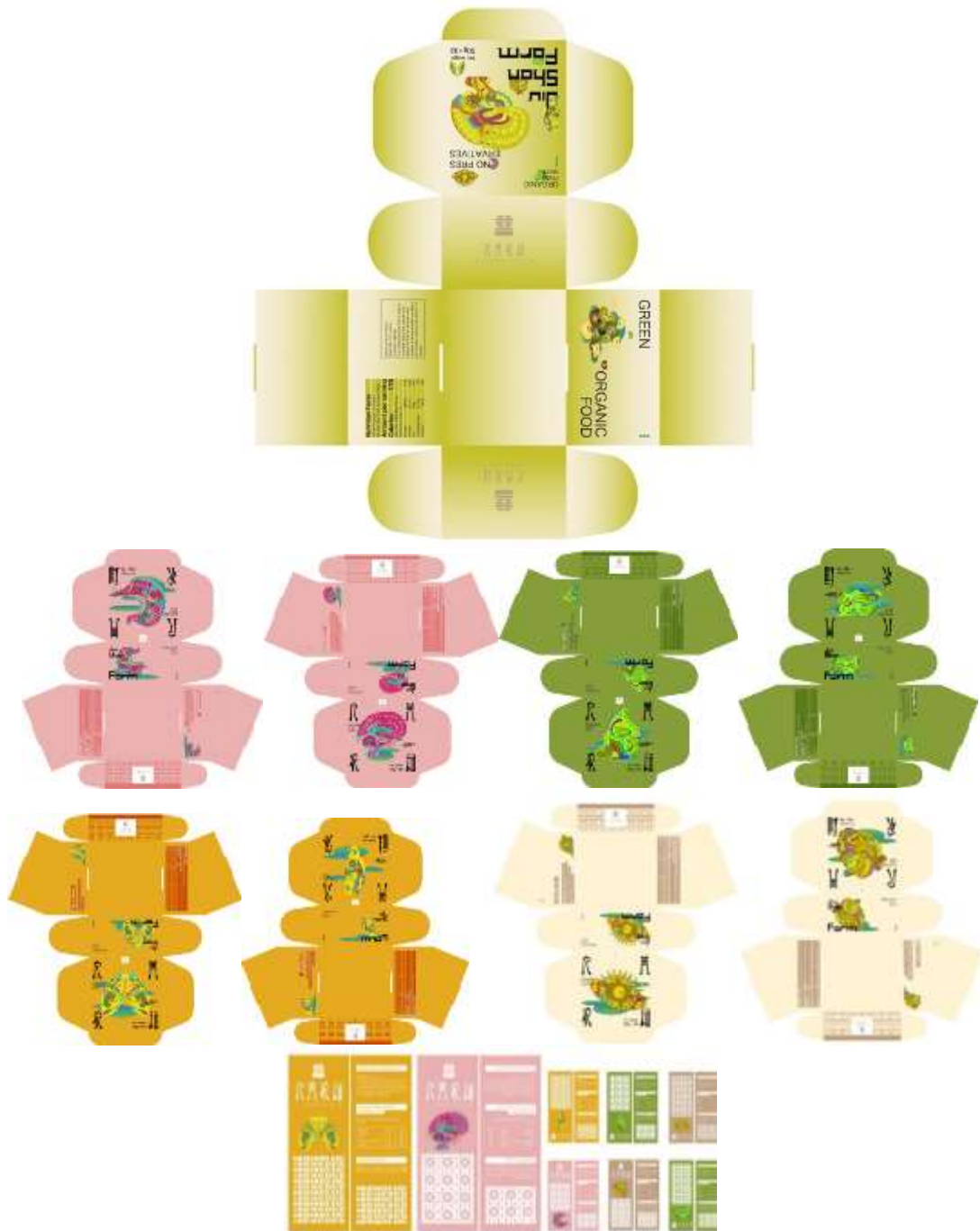


Figure 18 The layout of each package (The image is from the author, 2023)

Finally, the physical photo of the packaging. This page is a large package, printed on card stock. (Figure 19) In order to comply with the concept of environmental protection, the whole package does not use glue, but it is not solid enough structure.



Figure 19 The physical picture of the package printed on card stock (The image is from the author, 2023)

This one is Final product ,printed on cardboard. (Figure 20) In the exploration of the packaging, I used organic glue in order to make the structure more stable. In order to make it easy for the elderly and even all people to carry, I changed this, the carrying handle was changed to a shoulder strap, which can be carried more easily.



Figure 20 The physical picture of the package printed on cardboard (The image is from the author, 2023)

Display boxes on supermarket shelves. (Figure 21) In order to make the display box inside the small package can let everyone see more clearly, I made a bottom, which allows the small package to stand up.

The display box also did not use glue.



Figure 21 Pictures of display boxes on supermarket shelves and pictures of individual display boxes

(The image is from the author, 2023)

Small package. I chose paper as the material for the small package, which can be easily torn open. (Figure 22)



Figure 22 Pictures of small packages made of paper and pictures of small packages torn open

(The image is from the author, 2023)

Therefore, the above is a complete set of food packaging designs for mixed grains that I have created, based on the results of various research studies. This series includes a large box set, display boxes for eight different mixed grains formula (lungs, joints, liver, skin, heart, eyes, brain, and stomach), and individual pouches for each of the eight formulas.



5. Conclusion

From the perspective of aging in the new era, the humanized design of food packaging for the elderly should focus on "comfort + effectiveness + beauty." Though it's just one component of food packaging, it significantly impacts both food storage safety and the well-being of elderly consumers. Applying this knowledge base ensures that products are safe, efficient, and user-friendly for older adults (Fisk, 2002). Therefore, designers should skillfully transform received information into artistic design, catering to the various physiological, psychological, and behavioral needs of the elderly. They must also consider food properties, green material requirements, and elderly expectations for safe food packaging and easily handling. This approach aims to provide convenience and humanized design services to a broader elderly audience, reflecting the cultural content and humanistic care in food packaging for the elderly.

The aging design strategy for food packaging challenges traditional solidified thinking, offering innovative ideas to improve food packaging. Embracing more accessible approaches can revolutionize our lives, and we hope that everyone will contribute to the development of society.

6. Acknowledgements

First of all, I would like to give my heartfelt thanks to all the people who have ever helped me in this paper.

My sincere and hearty thanks and appreciations go firstly to my supervisor, Ajarn Tnop, whose suggestions and encouragement have given me much insight into these thesis studies. It has been a great privilege and joy to study under his guidance and supervision. Furthermore, it is my honor to benefit from his personality and diligence. This research would not have been possible without the great support from Ajarn Sridhar, Ajarn Tnop, Ajarn David for their practical suggestions and great support. They offered me a lot of help when I was conducting my research.

I am also extremely grateful to all my friends and classmates who have kindly provided me assistance and companionship in the course of preparing this paper. In addition, many thanks go to my family for their unfailing love and unwavering support.

Finally, I am really grateful to all those who devote much time to reading this thesis and give me much advice, which will benefit me in my later study.



References

- Arthur D. Fisk & Wendy A. Rogers.(2002).Psychology and Aging: Enhancing the Lives of an Aging Population. *Current Directions in Psychological Science*(3). doi:10.1111/1467-8721.00179.
- Buddeejeen, J., & Kengpol, A. (2018, July). Criterion Evaluation of Accessible Packaging Design for Aging Society. In 2018 2nd International Conference on Engineering Innovation (ICEI) (pp. 86-89). IEEE.
- Caitrin Lynch.(2015).Design for Aging: Perspectives on Technology, Older Adults, and Educating Engineers. *Anthropology & Aging*(2). doi:10.5195/aa.2015.108.
- Christelle Bou Mitri,Marilyn Abdessater,Hani Zgheib & Zeina Akiki.(2020).Food packaging design and consumer perception of the product quality, safety, healthiness and preference. *Nutrition & Food Science*(ahead-of-print). doi:10.1108/nfs-02-2020-0039.
- Douglas E. Crews.(2005).Artificial Environments and an Aging Population: Designing for Age-Related Functional Losses. *Journal of PHYSIOLOGICAL ANTHROPOLOGY and Applied Human Science*(1). doi:10.2114/jpa.24.103.
- Moyen M. Mustaquim.(2015).A Study of Universal Design in Everyday Life of Elderly Adults. *Procedia Computer Science*. doi:10.1016/j.procs.2015.09.249.
- Silvia Pericu. (2017).Designing for an ageing society: products and services. *The Design Journal*(sup1). doi:10.1080/14606925.2017.1352734.
- Slavin, J. L., Jacobs, D., & Marquart, L. (2000). Grain processing and nutrition. *Critical reviews in food science and nutrition*, 40(4), 309–326.