

# A Study of Photographs as Communication Content for Intergenerational Conversation Support System

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**Abstract.** With the deepening of aging and low birth rate in China, the single elderly or old couple living alone is more and more, who has a higher risk of senile dementia caused by disuse of cognitive function because of loneliness without communication. We propose an intergenerational conversation support system for Chinese elders for prevention of senile dementia. The most important part of this system is photos as contents, which can provide common topics to make conversation comfortable. This study aims to provide appropriate photos for conversation without burden between the elderly and the young. In order to examine the difference of the mental burden and the quality of communication by using photos as content, we measured the burden of both the young and the elderly depending on photo categories of “Food”, “Events”, “School” and “Commodity”. The methods of measuring burden were stress check, questionnaire and expression analysis. Results suggest that the more photos have in common between the elderly and the young, the less stress they have.

**Keywords:** Elderly · Photo category · Conversation support · Intergeneration · China

## 1 Introduction

China, which is in the face of a rapidly aging population and low birth rate as the result of “One Child Policy”, and also happens to have very similar demographics to that which existed in Japan two decades prior. First, Japan’s dependency ratio in the 1990s – i.e. the ratio of the non-working population, both children (<20 years old) and the elderly (>65 years old), to the working age population – is very similar to China’s in 2010 (Fig. 1). Second, the profiles of the number of working age people per dependent is very similar in the two countries (Fig. 2) [1].

As another result, the single elderly or old couple living alone is more and more, who has a higher risk of senile dementia caused by disuse of cognitive function because of loneliness without communication. Whereas specialized dementia care, such as memory/cognitive exercises are still very rare due to inadequate knowledge and few research about it, meanwhile the community-based services are still in the developmental stages in China [2]. For this, the ICT experience in Japan such as e-health etc.

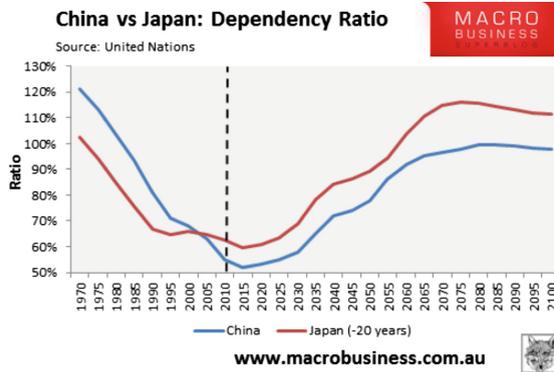


Fig. 1. Dependency ratio of China & Japan

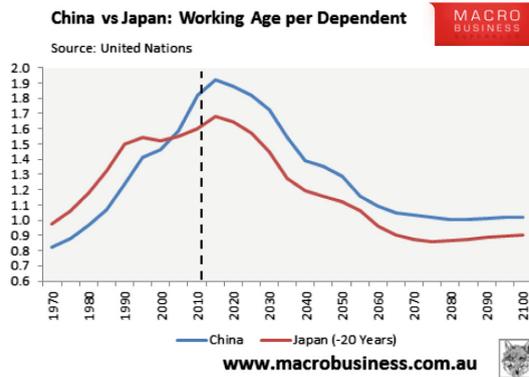


Fig. 2. Working age per dependent in China & Japan

will contribute to China. One of related works in Japan was Conversation Support System between the elderly and the young, which help the elderly and the young volunteer to talk each other without feeling any burden by using photos as common conversation contents [3].

We propose an intergenerational conversation support system for Chinese elders for prevention of senile dementia caused by disuse of cognitive function. The most important part of this system is photos as content, which could provide common topics for the conversation. Due to the large difference between the Chinese elders and Japanese elders in conversation, firstly we conducted the questionnaire survey about photos for Chinese elders in Taizhou and Nanjing city in Jiangsu Province China.

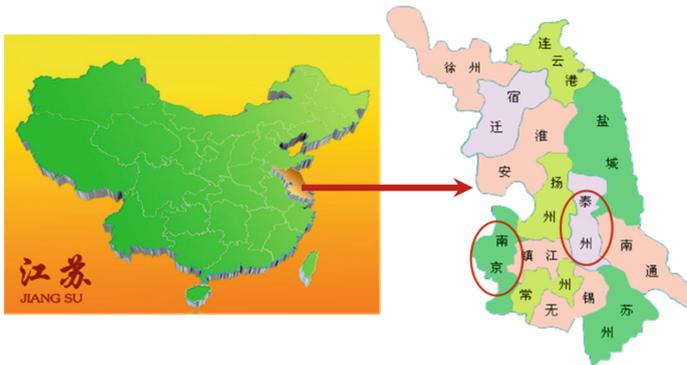
On the basis of the findings of the questionnaire, we used categories of “Food”, “Events”, “School” and “Commodity” to carry out our experiment of measuring the mental burden of participants in conversation. The experiment place was Suzhou city in Jiangsu Province China. We examined the mental burden of participants depending on photograph categories and photos with methods of stress check, questionnaire and

expression analysis. From the results of experiment, we found the photos appropriate for intergenerational conversation in China. Thus it is possible to clarify how to make good use of photos as content to make a comfortable conversation between Chinese elders and young people, and database photos in future research.

## 2 Preliminary Experiment

Referring to related works on reminiscence for the aged in Japan, there are reminiscence themes of “family”, “food”, “scenery”, “building”, “shopping”, “school”, “sports”, “home appliance” and so on [4, 5]. In order to examine if the same themes were appropriate for Chinese elders, according to which we carried out the questionnaire about photos in China.

The preliminary experiment was for 18 elders in Nanjing and Taizhou city in Jiangsu Province China (Fig. 3). The 150 photos were used according to 7 themes, which was “Food”, “Events”, “Scenery”, “Sports”, “School”, “Money” and “Commodity”. The questions for every photo of the questionnaire were the same that “Do you have good impression on this picture?”, and the answer was multiple choice by 3-stage subjective evaluation of “Yes, I have”, “No, I don’t”, “I don’t know”.



**Fig. 3.** Map of Jiangsu Province in China

The questionnaire results are shown in Fig. 4. In the photograph categories of “Food”, “Events” and “Scenery”, there is no photo that may interest elders. Although we know from the related research that Japanese elders are interested in the themes of “Food” and “Events” [5], Chinese elders shows no interest. It may be for economic reasons that Taizhou city is an underdeveloped economy area in Jiangsu Province, where elders suffered from food shortages, low incomes and had work, and had too little money and time to spent on food, holiday and travel when they were young. So they nearly don’t have any pleasant impression on “Food”, “Events” and “Scenery”. For the themes of “Sports”, “Money” and “Commodity”, more than 60% of elders chose the answer of “Yes, I have (good impression)”. Chinese elders shows the most interest in

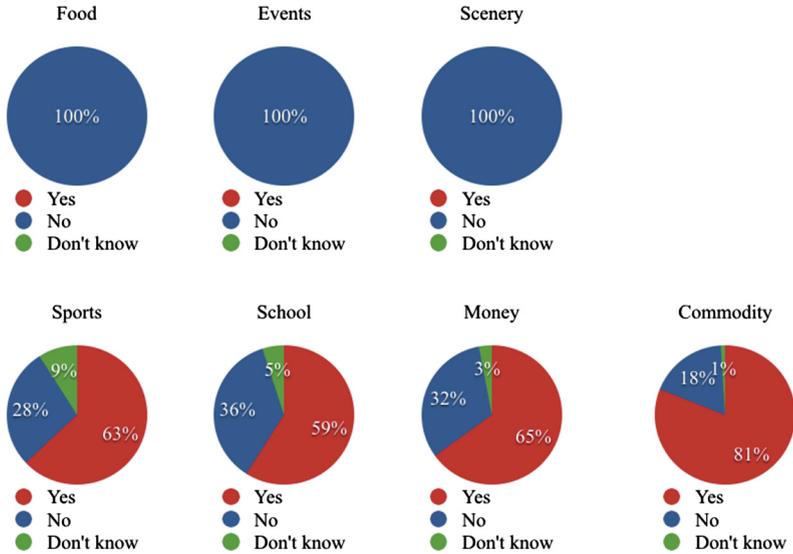


Fig. 4. Questionnaire result (yes = good impression, no = no good impression)

photos of old commodities in 1960s when they were young. It may be for culture reasons that family life is the most important in Chinese traditional concept. Photos of commodities as necessities of family life can recall elders a lot about their family.

### 3 Experiment

#### 3.1 Summary

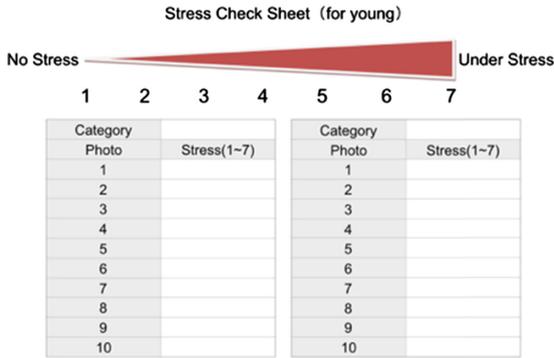
In this experiment the young talked with the elderly face-to-face while looking at the photos. We examined the degree of stress for the young, the mental burden of both the elderly and the young, and the feeling of happiness or unhappiness for the elderly depending on each category and photo in conversation.

The purpose of this experiment is for the young and the elderly to feel no burden in any photographic categories in conversation. Thus, when constructing the system, establishing an appropriate content database is considered possible.

#### 3.2 Evaluation Item

##### Stress Check

The young indicated the degree of mental load on the stress check sheet every minute in conversation. The stress check sheet represented a 1–7-scale. 1 means that there was absence of any stress to continue the conversation, and 7 means that person feels a lot of stress (Fig. 5).



**Fig. 5.** Stress check sheet

**Questionnaire**

The elderly and the young answered the questions by 5-stage subjective evaluation each time after the experiment as shown in Tables 1 and 2. The experiment’s results show subjective evaluation (questionnaire, degree of burden from the stress check sheet).

**Table 1.** Post-experiment evaluation (young)

No.	Question
1	Could you communicate naturally?
2	Was the conversation exciting?
3	Could you focus your attention in conversation?
4	Could you carefully listen to your partner in conversation?
5	Did you talk to your partner about your interests or hobbies?
6	Were you interested in what your partner talked about?
7	Was your partner easy to talk to?
8	Did your partner talk to you about her/his interests or hobbies?
9	Did you think the photos can help you find topics for the conversation?
10	Did you feel comfortable in conversation?

**Expression Analysis**

We analyzed the expressions of the patients from the video recordings. Analysis used the major literature “expression analysis” techniques to understand which photos made the elderly look happy or joyful [6].

In this expression analysis, we defined plus as a state of happiness, and minus as unhappiness. We used degree of happiness or unhappiness as the result for each photo.

**Table 2.** Post-experiment evaluation (elderly)

No.	Question
1	Could you communicate naturally?
2	Was the conversation exciting?
3	Could you focus your attention in conversation?
4	Could you carefully listen to your partner in conversation?
5	Did you talk to your partner about your interests or hobbies?
6	Were you interested in what your partner talked about?
7	Was your partner easy to talk to?
8	Did your partner talk to you about her/his interests or hobbies?
9	Did you think the photos can help you find topics for the conversation?
10	Did you feel the nostalgia of the topics in conversation?

### 3.3 Subject

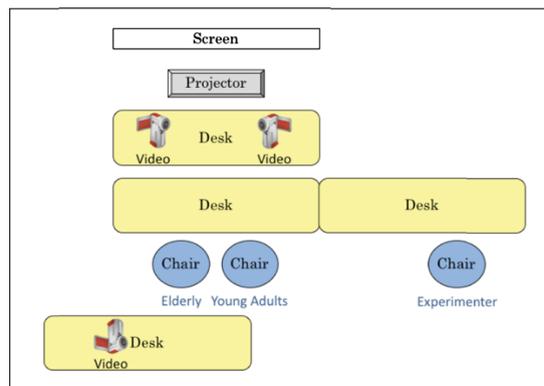
The conversation partners were 7 young female caregivers of Suzhou Social Welfare Home, and the elderly were 4 senior women and 2 senior man without dementia living there. But they don't know each other before.

### 3.4 Environment of Experiment

Because the function of eyes is often kept better than ears for the elderly, we brought a photograph into close-up and displayed on the screen by projector. The elderly and the young talked to each other face-to-face while looking at the screen to help the person hard to hear or watching.

The layout of the experiment was shown in Figs. 6 and 7 below.

We borrowed a meeting room in the nursing home, in which we placed desks and chairs side by side.

**Fig. 6.** The layout of the experimental environment



**Fig. 7.** Experimental environment

We used a MacBook in which photos categorized above were uploaded for a 10-min conversation.

We used a camera to capture the expression of the elderly throughout the sessions.

### 3.5 Materials and Methods

#### Materials

According to the results of Preliminary Experiment, this experiment used photograph categories of “School” and “Commodity”. Although “Food” and “Events” was shown no interest for the elderly in Taizhou city in Jiangsu Province China in the preliminary experiment, considering the economic reasons that Suzhou city is a richer area than Taizhou in China, this time we still used them. Each category was with 10 photos.

#### Methods

We prepared photograph categories of “Food”, “Events”, “School” and “Commodity” with each category of 10 photos by Keynote.

The elderly and the young sit down side by side and faced to the screen. Then we displayed the photos on the screen. They talked to each other while looking at the photos.

Each photo would be displayed for 1 min, and each category for 10 min. The young indicated the degree of stress on the stress check sheet every minute. The stress check sheet was out of sight of the elderly. Our purpose was to check the mental burden of the young, not to check their complaints to the elderly. Thus the young may point it without feeling any burden towards the elderly. They could judge honestly. They continued their talk while pointing was done at the moment.

They answered the questionnaire by the 5-stage subjective evaluation each time after the experiment.

A camera was used to capture the expression of the elderly throughout the sessions. The expression of the elderly was analyzed from the video recording.

### 3.6 Results

Figure 8 shows the amount of stress of young staffs accumulated for each photo. The horizontal axis shows the photo 1–photo 10 for each category, and the vertical axis represents the accumulation on the numerical stress check sheet. This is a comparison of stress levels for each category and photo, which is a comparison of the burden felt to continue the conversation as the conversation support content. Only the young’s stress levels are shown.

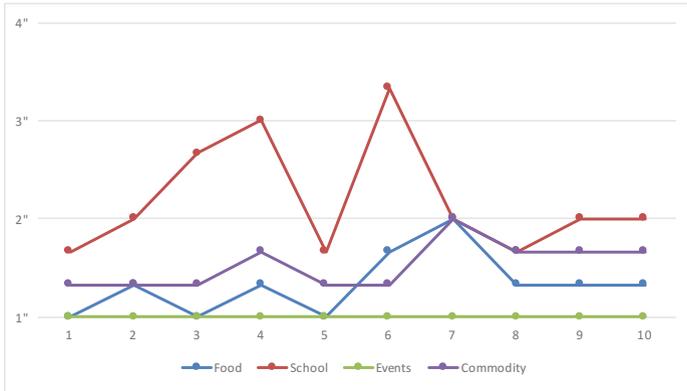


Fig. 8. Stress levels based on photo

The most stress was felt when photos depicting “School” category, in which especially photo 6 shows the most stress and the biggest difference from all other photos (Fig. 9). In the “Events” we found that it got the least stress and there was the same degree of stress for each photo.



Fig. 9. Photo 6 in “School” category

Figure 10 shows the results of the questionnaire for young staffs. The vertical axis represents the numerical value of the 5 rated questionnaire. The horizontal axis shows the questions Q1–Q10 for each category. A more detailed examination of the results of average stress is shown in Fig. 11.

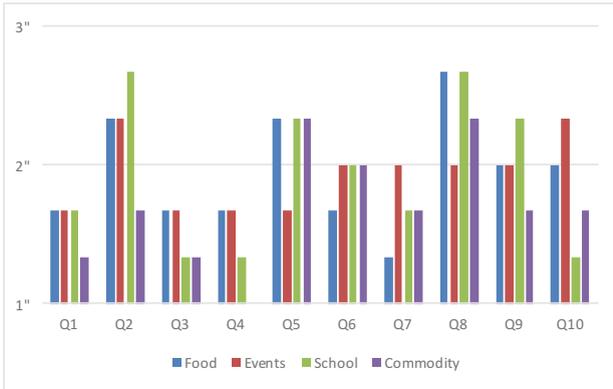


Fig. 10. Results-the young questionnaire (1 = no stress. 5 = extremely stress)

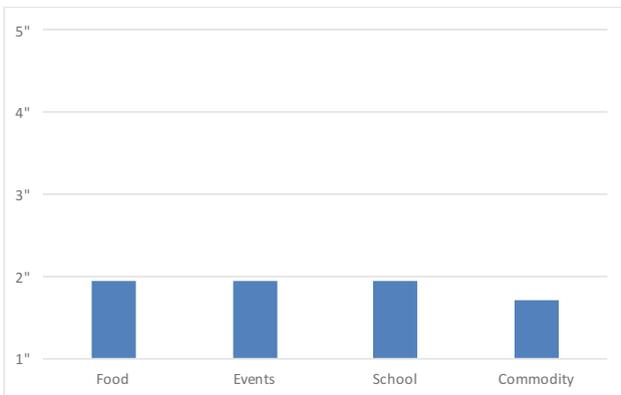


Fig. 11. Question 10 for young -stress levels (1 = no stress. 5 = extremely stress)

Questions for all categories got better results under stage3.

By Q10 of “Did you feel stressful in conversation?”, “School” got the least stress, and “Events” got the most stress.

Figure 11 shows the results of average stress levels of young staffs in conversation. In conversation of each category, it was found that the average stress for all categories got less stress under stage 2, “commodity” got the least average stress, and other categories nearly had no difference.

Figure 12 shows the results of the questionnaire for elders. The vertical axis represents the numerical value of the 5 rated questionnaire. The horizontal axis shows the questions Q1–Q10 for each category. A more detailed examination of the results of average stress is shown in Fig. 13.

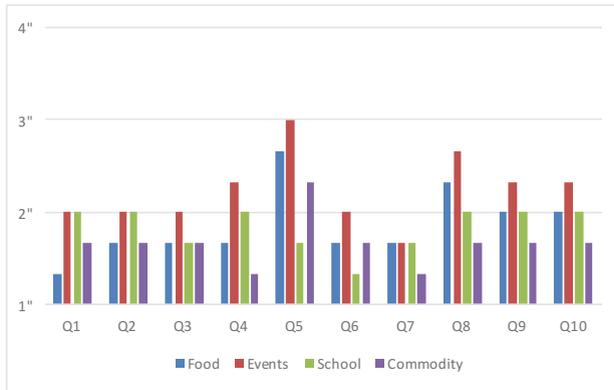


Fig. 12. Results-the elderly Questionnaire (1 = no stress. 5 = extremely stress)

Questions for all categories got better results under stage3.

By Q10 of “Did you feel nostalgia in conversation?”, “Commodity” got the least stress, and “Events” got the most stress.

Figure 13 shows the results of average stress levels of the elderly in conversation. “Commodity” got the least stress, and only “Events” got the result over stage 2.

Figure 14 shows the results of expression analysis for “Food” from the content of the video recorded during the experiment. The vertical axis represents the numerical value of elder’s happiness or unhappiness. The horizontal axis shows the photo1–10 in

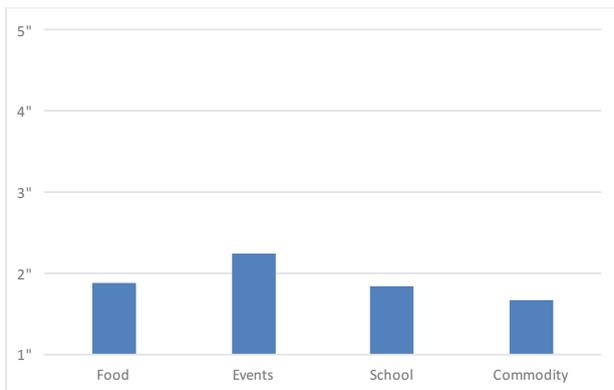


Fig. 13. Question 10 for elderly -stress levels (1 = no stress. 5 = extremely stress)

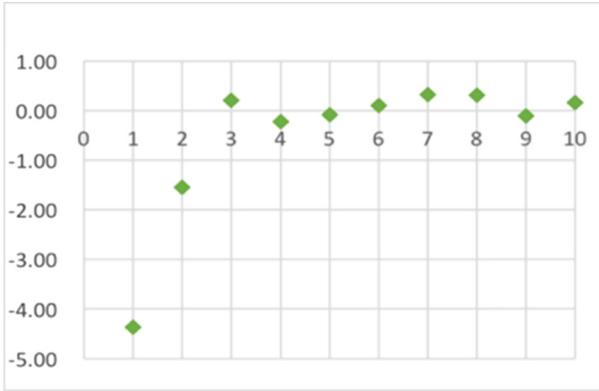


Fig. 14. Results of expression analysis for food (plus = happiness. minus = unhappiness)

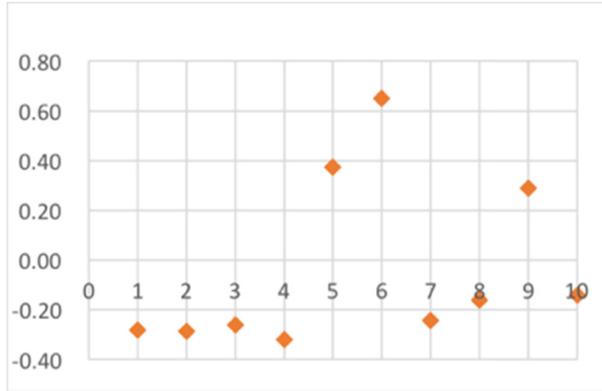


Fig. 15. Photo1 in “Food” category

food category. Photo1 shows the most unhappiness felt by the elderly and the biggest difference from other photos (Fig. 15). Perhaps it is because that this is the first photo in first category in conversation and the old man and the young staff met first. From the video recording, the first old man seemed a little bit nervous at the beginning of the conversation, but he soon loosened up talked smoothly.

Figure 16 shows the results of expression analysis for “Events” from the content of the video recorded during the experiment. The vertical axis represents the numerical value of elder’s happiness or unhappiness. The horizontal axis shows the photo1–10 in events category. Photo6 shows the most happiness felt by the elderly and the biggest difference from other photos (Fig. 17).

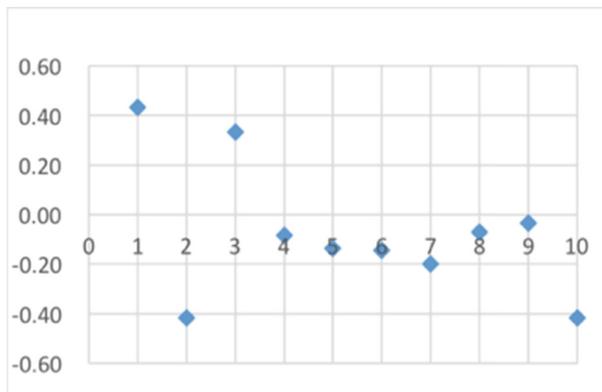
Figure 18 shows the results of expression analysis for “School” from the content of the video recorded during the experiment. The vertical axis represents the numerical value of elder’s happiness or unhappiness. The horizontal axis shows the photo1–10 in school category. Photo2 shows the most unhappiness felt by the elderly and the biggest difference from other photos (Fig. 19).



**Fig. 16.** Results of expression analysis for events (plus = happiness. minus = unhappiness)



**Fig. 17.** Photo6 in “Events” category



**Fig. 18.** Results of expression analysis for school (plus = happiness. minus = unhappiness)



Fig. 19. Photo2 in “School” category

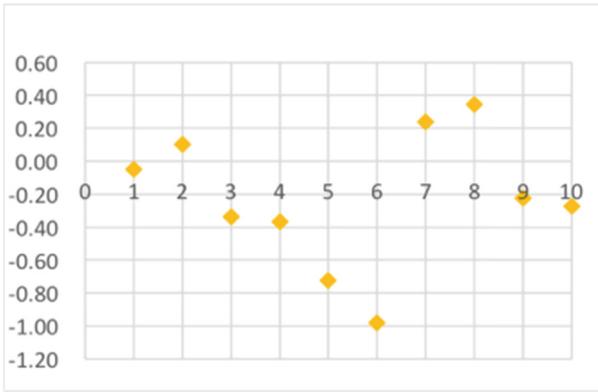


Fig. 20. Results of expression analysis for commodity (plus = happiness, minus = unhappiness)



Fig. 21. Photo6 in “Commodity” Category

Figure 20 shows the results of expression analysis for “Commodity” from the content of the video recorded during the experiment. The vertical axis represents the numerical value of elder’s happiness or unhappiness. The horizontal axis shows the photo1–10 in commodity category. Photo6 shows the most unhappiness felt by the elderly and the biggest difference from other photos (Fig. 21).

## 4 Discussion

From the results we found that there was different stress depending on categories between Japanese elderly and Chinese elderly (Table 3).

**Table 3.** China vs Japan: stress caused by category

Stress caused by category		China	*Japan
Stress check for the young	The most stress	School (in 1960s)	Lives during the Showa Era (1920s–1980s)
	The least stress	Events	Food events
Questionnaire for the young	The most stress	Events	Lives during the Showa Era (1920s–1980s)
	The least stress	Commodity (in 1960s)	Food events
Questionnaire for the elderly	The most stress	Events	Lives during the Showa Era (1920s–1980s)
	The least stress	Commodity (in 1960s)	Food

Japanese elderly is not interested in “lives during the Showa Era”, in opposite, Chinese show great interested in commodity in 1960s, and the same as young people. This result is the same as the preliminary experiment. It may be for culture reason that commodity can recall the Chinese people their family life, which is the most important thing in Chinese tradition.

All four photograph categories of “Food”, “Events”, “School”, and “Commodity” got the less stress results under stage 3. So they were appropriate for both Chinese elders and young people, which can help them to search common topics easily.

Even if the categories are appropriate for both the elderly and the young, different photo can cause different mental burden. The reasons of mental burden caused by photos are:

1. Age reason, such as old schoolbag (Fig. 9) and old schoolhouse (Fig. 19) in “School”, old kerosene lamp (Fig. 21) in “Commodity”, they are unknown by young people and make them feel stressful in conversation.
2. Regional reasons, such as boiled dumplings (Fig. 15), it is the most famous Chinese food, but in Suzhou city in south China, people doesn’t often eat it.
3. Culture reasons: such as photo of “children’s day” in “Events” category (Fig. 17), although Chinese elderly are not interested in “Events”, but they are very interested in children because in China families take care of disable elderly at home, the

concept of raising children for old age has long been popular, children is hope of Chinese family.

4. Commonality: for example, although the young is the most interested in “Events” (Fig. 8), by contrast, the elderly isn’t interested in it (Fig. 12), the young feel stressful when talking about “Events” with elders (Fig. 10).

## 5 Conclusion

For finding common topics and making an intergenerational conversation comfortable in China, we should make good use of the photos as followings:

- “Food”, “Events”, “School” and “Commodity” are appropriate categories for both Chinese elderly and young people.
- Photos about family life and children are the best topics for Chinese people.
- A photo with more commonality between two generations make conversation less stress.
- People living in different area of China has different habits and customs, so searching photos should consider the regional characteristics.

Methods of measuring the burden are considered possible to provide contents for comfortable conversation between the elderly and the young. Only a few methods were used in this study, that were stress check for the young, questionnaire for both the young and the elderly, and express analysis for the elderly. In future research we expect more methods of measuring the burden, such as heartbeats check for the young, and measure device easy for the elderly. Further more, it is necessary to make a similar experiment in other categories and more photos to increase appropriate categories for the content of intergenerational conversation support system. The young volunteers of this study are all the caregivers at nursing home, in the future study, we should let the young people without any care experience become the conversation partners.

However, the conversation support system can be considered useful for caregivers with limited psychological knowledge to provide memory/cognitive exercises for elders at nursing house in China.

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