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Article

Intergenerational Justice and Solidarity on Sustainability in China: A Case Study in Nanjing, Yangtze River Delta

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Abstract: The aim of this paper is to examine systematically the intergenerational justice and solidarity on sustainability in China, which is fundamental for achieving social/cultural change, whereas this is threatened by environmental unsustainability. A questionnaire survey with a sample size of 752 was carried out in Nanjing, Yangtze River Delta, China, with different age groups, and in the meantime, a series of qualitative studies was carried out through in-depth interviews and focus groups. It is shown that: with increasing age, people are more concerned about general and large-scale sustainability issue, whereas for smaller scale and immediate sustainability issues, there is no clear tendency with increasing age; older generations are more concerned about the causes of climate changes; in terms of responsibility for environmental problems, there are statistically-significant view changes with increasing age; for priority considerations in sustainability, among age groups, at the personal level, there is generally no statistically-significant difference, whereas at the public level, there are some statistically-significant differences; for preserving the future, there is generally no statistically-significant difference among age groups. Overall, there are considerable differences in intergenerational justice on sustainability, although there are still indications of solidarity among generations.

Keywords: intergeneration; justice; solidarity; sustainability; environment; priority; Nanjing; Yangtze River Delta; China

1. Introduction

The creation of ‘a society for all ages’ is one of the United Nation’s key goals [1], for which the considerations of intergenerational justice and solidarity are vital, with fast changes across the world both socially and culturally. In fast developing countries like China, environmental unsustainability is becoming a key issue, for which it is of significance to examine justice and solidarity between generations [2].

There has been considerable research on intergenerational justice, especially from a Western perspective, relating to the Post-War Period, with fast economic and technological development and corresponding social and cultural changes [3–7]. Facing the contemporary financial crisis and environmental challenges, the current younger and future generations may have different attitudes about sustainability, even for certain specific aspects such as physical environmental sustainability [8], and it is important to question if they should be bound by past promises [9–13]. Solidarity refers to a different dimension from justice, although analysis indicates that there are areas in which they overlap [14]. Indeed, the challenges of bridging generations and addressing the needs of the aging and young alike should be examined carefully from both angles: intergenerational justice and solidarity [15,16].

Sustainability and sustainable development are very widely defined. While in the scientific literature, sustainability refers to the management of a natural resource, in social sciences, sustainable development concerns not only economic growth, but also welfare, equity, governance and a cohesive social system [17,18]. The definition and consideration of sustainability and sustainable development have been evolved gradually [19], and there has been a range of approaches [20,21]. There have been strong integrations among different facets and intergenerational justice, and solidarity is certainly a key consideration.

While there has been much attention on Chinese citizens' attitudes towards economic reform and development, there is also a growing interest in their views on sustainability and environment, where intergenerational negotiation and conflict over sustainability and sustainable development have emerged, taking China's cultural heritage into account. It is vital to consider the effect of economic development on the environmental and sustainability issues, for which it is also interesting to examine whether growing environment awareness will affect relevant government policies. From the global perspective, the worldwide concern about environmental quality and economic development has a rather long history since the UN Conference on the human environment in Stockholm [22]. It is important to consider the balance and relations between production and pollution and environmental degradation and the remedying cost [23–25]. The potential of intergenerational justice and solidarity for the achievement of the sustainable development goals has had attention paid to it [26].

There is therefore a recognized need for a systematic research of the intergenerational justice and solidarity with respect to sustainability in China, which is the overall aim of this paper. More specifically, this paper aims to examine the perceived current situation of sustainability, the cause of the problems, priority considerations in sustainability, responsibility for environmental problems and preservation for the future. A large-scale survey was carried out in Nanjing, Yangtze River Delta, China, with different age groups, considering those aspects. This is combined with a series of qualitative studies, which were carried out through in-depth interviews and focus groups.

2. Method

2.1. Site Selection

The one-child policy has generated significant change in kinship structure, marriage systems and social-cultural practices [27,28]. Contemporary rapid economic growth has not only brought wealth, reduced poverty and contributed to a new consumer culture, particularly among the younger generation, but also has caused huge environmental impacts, triggering debate over national/international sustainability [29].

To reflect such typical situations in China, the city of Nanjing was selected as the case study. It is the capital of Jiangsu Province of China and the second largest city in the East China region, with an administrative area of 6600 km² (2500 mi²) and a total population of 8,270,500 as of 2016 [30]. Situated in the Yangtze River Delta region, Nanjing has a prominent place in Chinese history and culture, having served as the capital of various Chinese dynasties, kingdoms and republican governments dating from the Third Century to 1949 and has thus long been a major centre of culture, education, research, politics, economy, transport networks and tourism, being the home to one of the world's largest inland ports [31]. The city is also one of the fifteen sub-provincial cities in China's administrative structure.

The Yangtze River Delta region is one of the fastest and most developed regions in China. Consequently, environmental and sustainability issues have been paid much attention at different stages of this fast development, along with the fast changes of social issues. In other words, Nanjing represents an area in China where relevant issues relating to intergenerational justice and solidarity on sustainability have possibly been shown, and many other Chinese cities will perhaps follow with similar patterns.

2.2. Questionnaire Survey

Explorations of intergenerational justice and solidarity require comparisons between generations, yet generation is a slippery term. There are three ways of thinking about intergenerational justice and solidarity: between familial generations (i.e., across kinship); between generations as age cohorts (e.g., ‘young’ vs. ‘old’); and between chronological generations (those who have lived in the past, those alive now and those to be born in the future) [32]. This study focuses on the age cohorts, although the other two aspects are also considered in the analysis. The concept of intergenerational justice and solidarity raises fundamental questions about the nature of entitlements (Who has the right to what?), impacts (Who bears the consequences of past and present choices?) and debts (Who owes what to whom?) [33]. These issues are assumed to be about time because they unfold between past, present and future generations, but they are also about space because particular choices have consequences at different scales: within families and between communities/regions.

The study presented in this paper, as a part of an overall international comparative study [34,35], involves the collection and analysis of the materials in terms of demography (e.g., the composition and spacing of generations), cultural values (e.g., understandings of familial obligations, moralities and notions of personhood), histories, material cultures, cultures and patterns of consumption and environmental assets and problems. In particular, there were a number of structured questions relating to sustainability, considering various aspects including the perceived current situation of sustainability, the cause of the problems, priority considerations in sustainability, responsibility for environmental problems and preservation for the future. The survey was piloted, and appropriate adjustment was made before the formal survey stages. The questions in the overall questionnaire study analysed in the paper include:

- ‘What environmental issues are you concerned about?’: extreme weather, food shortage, air pollution, cutting trees, flooding, energy shortage, inadequate household waste disposal, overdevelopment and losses of green space, and industrial waste.
- ‘Which of the following things do you think cause climate change?’: human actions, industry, natural changes, and the things you buy and use; where a four-point scale was used, with 1 as ‘not at all’, 2 as ‘might contribute’, 3 as ‘definitely contributes’, and 4 as ‘major cause’.
- Question about the responsibility for environmental problems: (I) Past generations in China have consumed too many resources, leaving not enough for today; (II) Our environment suffers because the younger generation are more materialistic than previous generations; (III) It is fair that older generations should make sacrifices to save resources for younger generations; (IV) It is fair that people like me in China should make sacrifices to save resources for future generations; (V) The older generation have more knowledge about protecting the environment; (VI) Countries produce more pollutions like the UK and China owe a debt to poorer countries for contributing to climate change there; where a five-point scale was used, with 1 as ‘strongly agree’ and 5 as ‘not at all agree’.
- ‘When thinking about sustainability, what are your priorities?’: supporting my family’s basic need, looking after my health, leaving an inheritance for my descendants, achieving a better lifestyle for myself, achieving a better lifestyle for my children, conserving the natural environment, supporting the local economy, cutting down on waste, maintaining tradition, and developing/maintaining a state welfare system; where a five-point scale was used, with 1 as ‘a top priority for me’ and 5 as ‘not at all a priority’.
- ‘What is important to persevere for the future?’: wealth (e.g., money), property/land, natural resources (e.g., clean air, fuel sources), natural environment (e.g., forests, river and lakes), art and cultural heritage, traditional knowledge (e.g., farming, handicraft skills), traditional values (e.g., moral codes) (g), wildlife, and social welfare system (e.g., medical support system, schools); where a five-point scale was used, with 1 as ‘preservation very much needed’ and 5 as ‘not at all needed’.

In the case study city of Nanjing, a four-stage sampling process was applied in this study. In China, the geographical scales within a city include (ordered by size from large to small): district (qu in Chinese), street (jiedao in Chinese, similar to ‘neighbourhood’ in English) and community (shequ in Chinese). Firstly, urban districts were randomly sampled, including two downtown districts and one outskirt district. Secondly, five streets were sampled from each selected district. Thirdly, five communities were selected from each sampled street. Finally, ten residents were sampled from each community, including both males and females, with various ages, occupations and income levels.

The total sample size was 752, with 374 males and 378 females. The age ranged from 16–90, and the distribution is shown in Figure 1a. It can be seen that most interviewees were in the age range of 21–70, with similar percentages, whereas the age groups of <21, 71–80 and >80 have relatively smaller numbers, although all greater than 10. In terms of personal income, as shown in Figure 1b, it was classified as four levels, >100k Yuan, 50–100k Yuan, less than 50k Yuan and no income. It can be seen that the percentage of different groups approximately follows a normal distribution. Figure 1c shows the education distribution, where it is seen that the number of people in the middle school and college/university groups is similar, whereas the percentage of people at the primary school level is considerably less, reflecting the current education level in China [36]. In terms of occupation, eight categories were used, by considering the Chinese Standard Classification of Occupation (CSCO) [37], including senior managerial or leadership roles, skilled professional with leadership responsibilities, skilled professionals (e.g., teacher, nurse), skilled manual or service (e.g., crafts, trades, supervisor), routine manual or service (e.g., labourer, sales), casual employment, homemaker, retired, student and unemployed. It is seen that there is a wide range of occupations among the sampled interviewees.

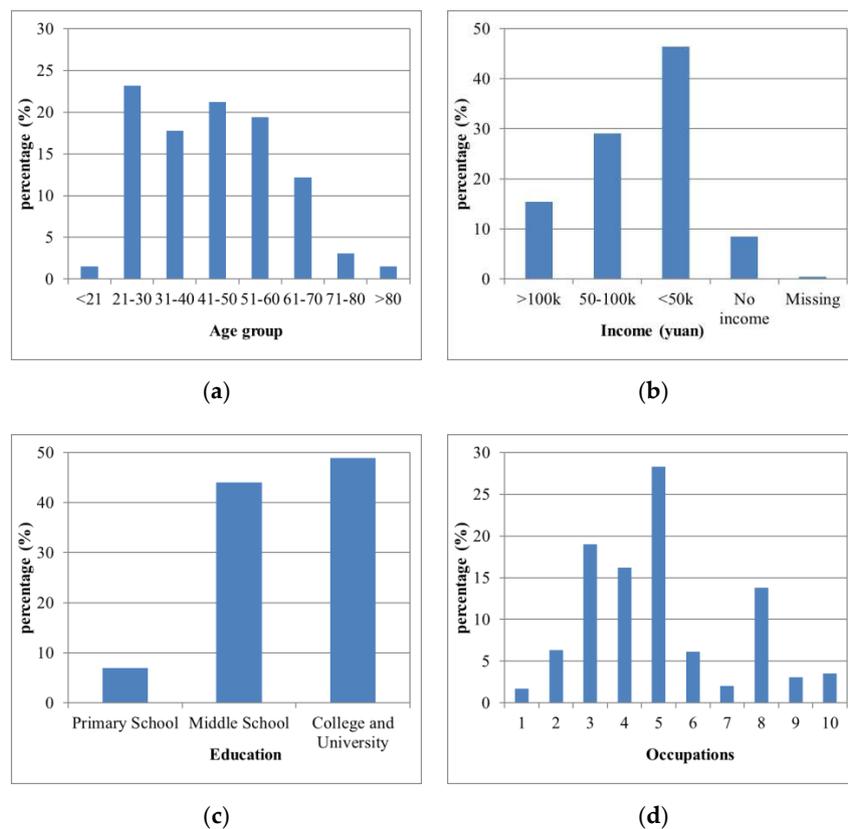


Figure 1. Interviewees' distribution (%) in terms of age (a), personal income (b), education level (c) and occupation (d), where the occupations are: 1, senior managerial or leadership role; 2, skilled professional with leadership responsibilities; 3, skilled professional (e.g., teacher, nurse); 4, skilled manual or service (e.g., crafts, trades, supervisor); 5, routine manual or service (e.g., labourer, sales); 6, casual employment; 7, homemaker; 8, retired; 9, student; 10, unemployed.

The questionnaire survey was conducted in Nanjing from 1–30 May 2016, through face-to-face interviews. Each interview lasted about 30 min.

2.3. Qualitative Study

In the meantime, a series of qualitative research studies was carried out in two strands, Strand A and Strand B.

Strand A focused on who is entitled to what. Generational views on entitlements to consumption, explored through in-depth qualitative research including narrative interviews ($n = 90$) from a generationally-stratified subsample recruited from the survey; as well as recognizing the relational character of identity and generational dialogue groups comprising broad cohorts ($n = 27$ in total: 3× younger, middle-aged and older groups per context). Questions asked included: ‘What is something you bought and you thought was a waste?’; ‘What is something you didn’t have when you were young but now you have it?’; ‘Will your decisions on what you consume, what you use, depend on how it affects the environment?’; ‘What is the most important consideration when you purchase something?’; ‘What do you think is the worst thing you’ve ever done to the environment? Have you ever damaged the environment?’; ‘What do you think is the differences in consumption mindset and level between, your parents’ generation, your generation and the future generation?’; ‘Have you ever thought about what the consumption will be like in other countries? Will they be more eco-friendly?’

Strand B focused on who wins and loses; perceptions of intergenerational equity in consumption. In-depth qualitative research was conducted using a purposively sampled three-generation family design ($n = 15$) with a child, parent and grandparent (‘family’ was interpreted flexibly to take into account alloparenting and diverse family forms). Intergenerational theatre was also carried out to explore different generational perspectives about equity [38,39]. Questions asked included:

- ‘Do you think exchanging gifts helps to strengthen your family ties?’;
- ‘In your view, what do you mean by necessity?’
- ‘What do you think your parents would view as necessities?’
- ‘And what about your grandparents?’;
- ‘What do you think would be a quality lifestyle?’;
- ‘Do you think your life is much better than previous generations?’;
- ‘In your view, if we pay attention to environmental issues, then will it affect social issues?’; ‘What is the biggest environmental change you have experienced in your life?’;
- ‘In your view, which generation suffers the most from air pollution or smog?’;
- ‘So where do you find out about the environmental impact on the world and China?’;
- ‘In your view, who should be responsible for environmental changes, people in the past, present or future?’;
- ‘So what shapes your sense of responsibility, traditions or other factors?’;
- ‘What do you think is the ideal familial relationship?’;
- ‘How do your family share financial resources?’;
- ‘In the future, if you happen to have something left, then you will give it to the future generation?’.

3. Results

While in the questionnaire survey, a number of questions were asked, the analysis in this section focuses on five key aspects, including current situation of sustainability, cause of problems, responsibility for environmental problems, priority considerations in sustainability and preservation for the future. The analysis in this section is based on the questionnaire survey, as well as the results from the qualitative study.

3.1. Current Situation of Sustainability

In China, environmental problems have been a major issue, closely related to sustainable development. Figure 2 shows the results on the question of ‘What environmental issues are you concerned about’, in terms of the opinions of different age groups, with a five-point linear scale of 1 as ‘very concerned’ and 5 as ‘not at all concerned’. It can be seen that with increasing age, there were statistically-significant tendencies that people feel more concerned about key sustainability issues in terms of extreme weather ($p < 0.01$), food shortage ($p < 0.01$), air pollution ($p < 0.01$), cutting trees ($p < 0.01$) and flooding ($p < 0.05$). For energy shortage and inadequate household waste disposal, there tended to be similar tendencies, also with negative correlation coefficients, although not statistically significant. In terms of overdevelopment and losses of green space, as well as industrial waste, the age difference was not statistically significant.

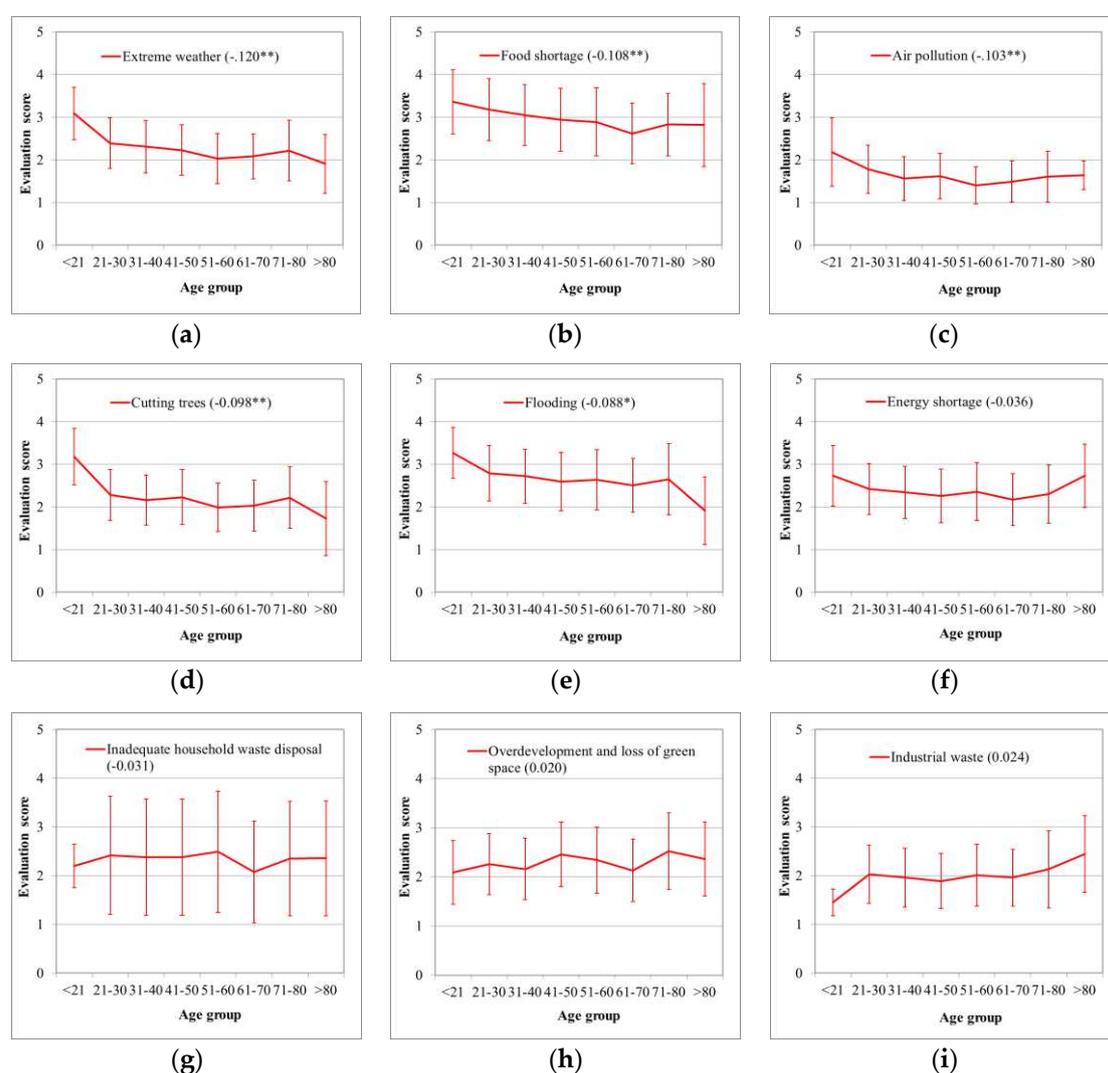


Figure 2. Evaluation results of different age groups on the question of ‘What environmental issues are you concerned about?’, in terms of extreme weather (a), food shortage (b), air pollution (c), cutting trees (d), flooding (e), energy shortage (f), inadequate household waste disposal (g), overdevelopment and losses of green space (h) and industrial waste (i), where a five-point scale was used, with one as ‘very concerned’ and five as ‘not at all concerned’. The numbers in brackets indicate the Pearson correlation coefficient; * indicates that the correlation is significant at the $p = 0.05$ level; and ** indicates that the correlation is significant at the $p = 0.01$ level (two-tailed).

Generally speaking, those results suggest that with increasing age, people are more concerned about general and large-scale sustainability issue, whereas for relatively smaller scale and immediate sustainability issues, there is no clear tendency with increasing age. While this paper is part of an overall global study, it is of interests to look at this from a cross-country comparative perspective. It seems that those results are different from those in Western countries to a certain extent. In the U.K., for example, older people tend to be concerned more about their local, smaller scale issues, often related to environmental and sustainability aspects [40].

In addition to the variations with age, it is interesting to note that among various environmental issues, the most concerned for all age groups was air pollution and the least concerned was food shortage. A university student in the age group of 21–30, when asked about the biggest environmental change she had experienced in her life, indicated that: ‘Maybe air pollution. It affects our mobility, outdoor activities and commuting to school. It has a strong impact on our daily activities. It affects our school education, like physical education. When the pollution was serious and the PM2.5 exceeded 500, 300 or 200, schools would close for the day.’

A retired engineer in the age group of 71–80 was even more concerned, not just for himself, but also for the next generations. He indicated that: ‘The first thing I do every morning is to turn on the radio to listen to the news and weather forecast. I also follow the weather conditions on TV at noon and night. I once worked making tidal forecasts, for which we needed to get the weather map from the weather bureau to analyse. The influence is inevitable. If you go out on a smoggy day, you need to wear a mask and a special mask, because ordinary ones won’t protect you very well. I think my grandchildren’s generation will become the biggest victims, because they are young and their lungs are still developing.’

Industrial waste is also a major concern, with an average score of 1.985 across the age groups. For example, a female professional in the age group of 31–40 said ‘I often go back to my hometown where I grew up with my grandparents, which was a beautiful place with clear water and green mountains. A new quarry factory was open recently. I went to ask them how the waste water is processed in the factory. They told me it goes to the river directly. Many rivers in the villages are piled up with rubbish.’

3.2. Cause of Problems

While overall sustainability is generally rather of concern for people across age groups, as shown in the previous section, it is interesting to examine what people think the causes of those problems are. More specifically, a question was asked on ‘Which of the following things do you think cause climate change?’ Figure 3 shows the evaluation results regarding four factors, namely human actions, industry, natural changes and the things you buy and use. It can be seen that for all four factors, there was a statistically-significant correlation between age and the evaluation, namely, with increasing age, people tend to think those causes are contributing more to climate change. In other words, older generations are more concerned about the causes of climate changes, although overall, the actual differences between age groups were not large.

Among the four factors, the ranking in terms of the level of concern was industry (79.1%), human actions (66.7%), natural changes (63.6%) and the things you buy and use (51.6%), where four equals 100% as ‘major’ and one equals 0% as ‘not at all’. In the meantime, the interviewees expressed many concerns relating to human actions and the things you buy and use. A university student in the age group of 21–30 indicated that human action in modern living is a cause of the problem: ‘In downtown area of Nanjing, for example, I see sports cars racing very fast in the street at night, which I think, . . . , it burns a whole lot of oil, which is already terribly in shortage. China’s oil supply depends largely on import, but these people are wasting oil just for personal pleasure.’ ‘If the climate change is extreme, then we have to use air conditioning or a heater. This actually increases our resource consumption.’ He was also concerned that luxury goods’ consumption would cause environmental problems too: ‘I think reasonable consumption means first of all to satisfy one’s basic needs, including some extra

needs on top of material supplies, such as travelling, as people have different inclinations toward basic needs, which is understandable. But wasteful consumption is not reasonable, like buying luxuries, designer handbags or clothes.'

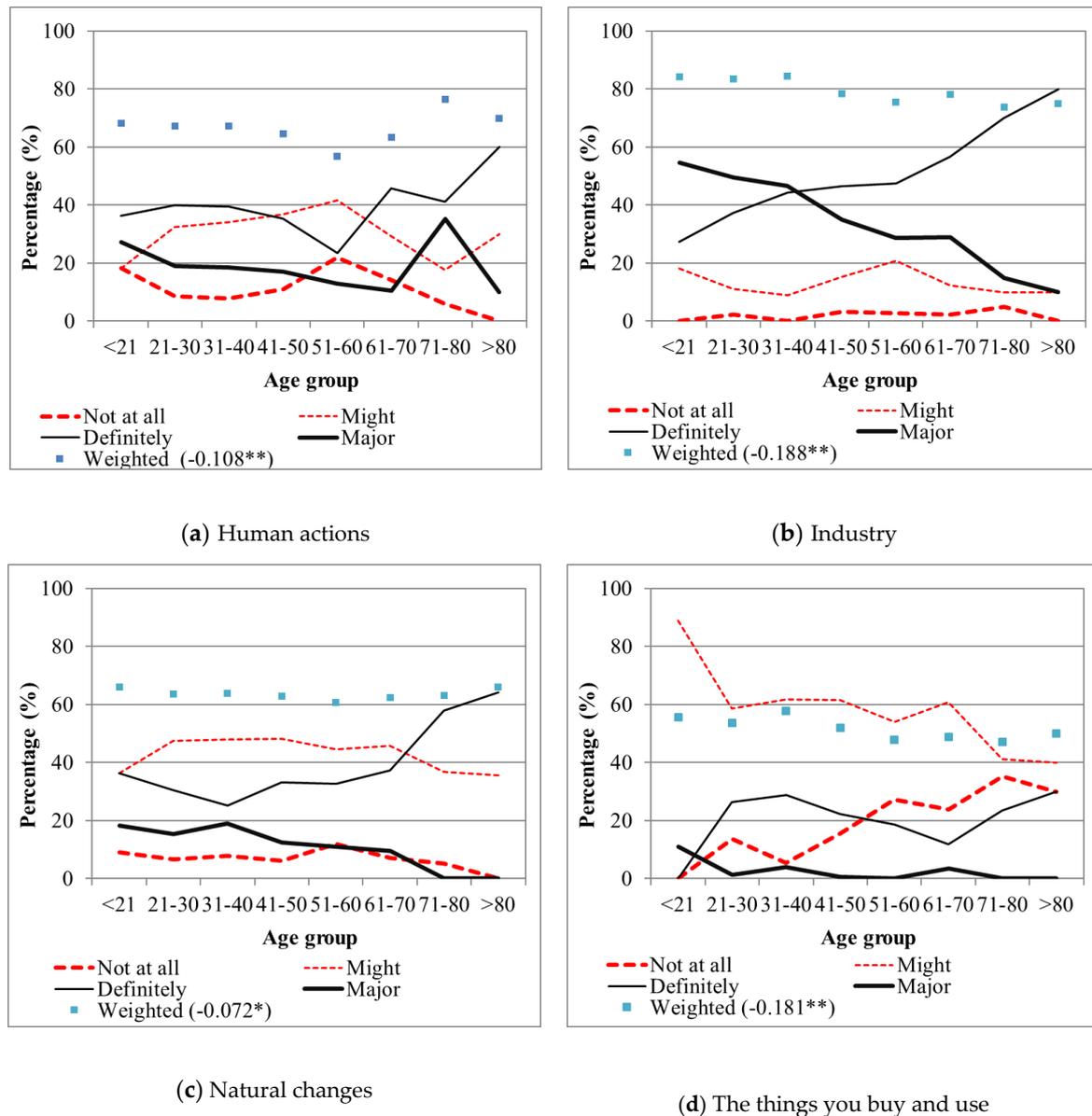


Figure 3. Evaluation results of different age groups on the question of ‘Which of the following things do you think cause climate change?’, in terms of human actions (a), industry (b), natural changes (c) and the things you buy and use (d), where a four-point scale was used, with one as ‘not at all’, two as ‘might contribute’, three as ‘definitely contributes and four as ‘major cause’. The square dots represent the weighted evaluation score by converting the four-point scale to percentage (i.e., four equals 100%), and the numbers in brackets indicate the Pearson correlation coefficient, with * indicating correlation significance at the $p = 0.05$ level and ** indicating correlation significance at the $p = 0.01$ level (2-tailed).

Another university student in the age group of 21–30 was also concerned about everyday consumptions: ‘I would refer to something small, like the over-consumption of print paper by the end of school semesters, which I regard as unsustainable. I also think the ink powder used at the printing shops is a big pollutant to the environment. . . . I came to know that photocopiers could cause much pollution, and waste paper, . . . this really causes a terrible problem.’

This view was shared by a female teacher in the age group of 41–50, who loves traveling and shopping for clothes on line: ‘I feel, at least, people should shop with responsibility. You should not buy things that you do not need or buy things just because they are on special or to round up for orders. But sustainable consumption should not just be customer responsibility. Government and business owners should play bigger part in it. If you stimulate customers to much with the purposes of promoting GDP increase, we are human beings, we would fall into the trap. Then it is a bad cycle and unsustainable. For some good quality clothes, I will not wear anymore. But they are in good condition. We put them into the bin to recycle. But I feel they are better in the bin than being thrown away.’

A retired university teacher in the age group of 71–80, with the hobby of photography, was concerned about recycling, especially the items with major environmental effects: ‘What I am concerned about a lot are batteries. Batteries from the radio, the remote control and the camera, , are non-degradable. They can remain non-degradable for generations and several hundred years, thus can cause a significant impact on the environment. There was once a trash bin at the entrance of the community.’ ‘To recycle batteries which I think is very good. I usually pack up my useless batteries and threw them into it. But no one came to collect them when the bin was full, then it was removed. I don’t know where to throw these batteries. I once asked the security guard and he said the recycling bin had been taken away. So I have to throw them into ordinary bins.’ ‘The government should put specific trash bins used to recycle waste batteries and electronic products on streets or at the entrance of communities in medium-sized cities like Nanjing.’

A female manager in the age group of 51–60 also mentioned the differences between cities and villages, which is a significant issue in China [41]: ‘Compared to the city, villages are disadvantaged. In the city, there is government and infrastructure. Even city dwellers do not have the knowledge and attention to do it but the government will guide them. But in villages, firstly, authorities do not act upon their responsibility. Secondly, farmers do not have the concept. They only care about the short-term benefits, like houses, schools, food. They do not think about next generation much. But if people who can think about it can do something for them? From environment perspective, I always think what can I do?’

3.3. Responsibility for Environmental Problems

It is also important to examine what people think about the responsibility for the environmental problems. Six statements were given for the interviewees to indicate their opinions, with a five-point scale, from ‘strongly agree’ to ‘not at all agree’. The statements included: (I) Past generations in China have consumed too many resources, leaving not enough for today; (II) Our environment suffers because the younger generation is more materialistic than previous generations; (III) It is fair that older generations should make sacrifices to save resources for younger generations; (IV) It is fair that people like me in China should make sacrifices to save resources for future generations; (V) The older generation has more knowledge about protecting the environment; (VI) Countries that produce more pollution like the U.K. and China owe a debt to poorer countries for contributing to climate change there. The statistical results are shown in Figure 4. It can be seen that for all the statements, there is a statistically-significant correlation between age and their indication, namely, with increasing age, people tended to be more agreeable to the statement, except for Statement I, for which with increasing age, people tended to be less agreeable.

A female college student in the age group <21, when asked about who should be responsible for environmental changes (people in the past, present or future?), answered: ‘People living in the present. There is no point holding the people who lived in the past accountable. No point blaming them. Maybe it is too late to solve it in the future.’ When she was asked about which generation of her family cares most about environmental issues, she said: ‘I think it’s my grandparents’ and my generations. In terms of quality of life, my grandparents are very careful with their spending. And that will contribute to environmental protection. So for me, since my childhood, my tutor at nursery kept reminding us about environmental issues and the like. I think my grandparents’ and my generation

is the best in this aspect, but my parents' generation is not so good. Based on my observation of my parents' behaviour since I was a child. Some environmental protection steps are not so easy to follow, like saving drinking water and so on. Some can be tricky.'

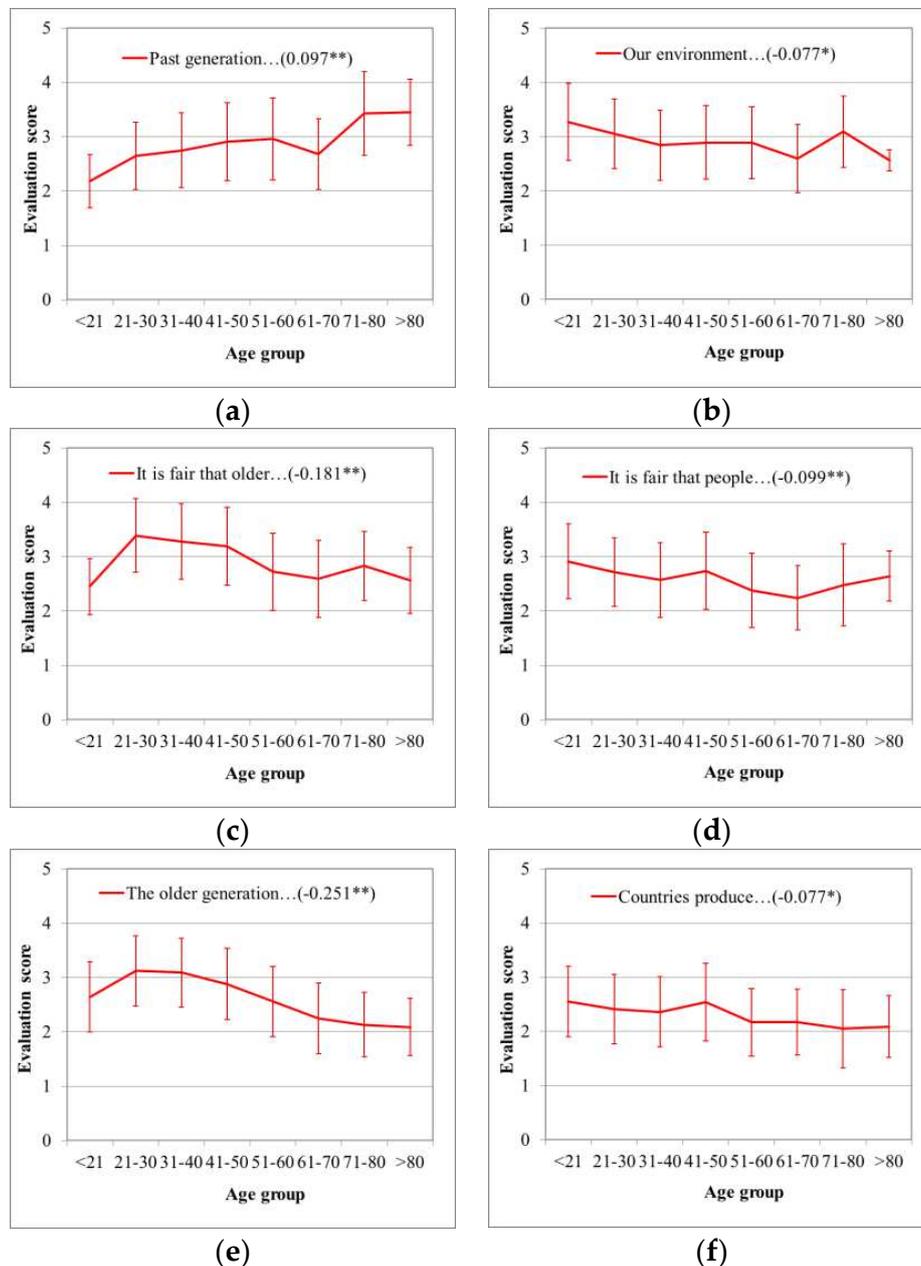


Figure 4. Evaluation results of different age groups on a question about the responsibility for environmental problems: (a) Past generations in China have consumed too many resources, leaving not enough for today; (b) Our environment suffers because the younger generation is more materialistic than previous generations; (c) It is fair that older generations should make sacrifices to save resources for younger generations; (d) It is fair that people like me in China should make sacrifices to save resources for future generations; (e) The older generation has more knowledge about protecting the environment; (f) Countries that produce more pollutions like the U.K. and China owe a debt to poorer countries for contributing to climate change there; where a five-point scale was used, with one as 'strongly agree' and five as 'not at all agree'. The numbers in brackets indicate the Pearson correlation coefficient; * indicates that the correlation is significant at the $p = 0.05$ level; and ** indicates that the correlation is significant at the $p = 0.01$ level (two-tailed).

A female teacher in the age group of 41–50, when asked about who should be responsible for implementing the ideas of environmental protection and energy conservation for the future, indicated that ‘Everyone. Everybody should be responsible. If you live in the world for one day, then you should be responsible for the environment, including the resources.’

A retired professional in the age group of 71–80, when asked if the pollution problem was caused by the current generation or the previous generation, said: ‘The past should take part of the responsibility, but the pollution was mainly caused by the current generation, because every country in the world is trying its best to grow their economies, and pollutants generated from the development process affect the environment.’

3.4. Priority Considerations in Sustainability

While from the results in Figure 1, it can be seen that people across generations in the case study city are generally very concerned about environmental and sustainability issues, with an average score of 2.29 considering all age groups and all nine issues, it is important to examine the priorities when people think about sustainability. Figure 5 shows the results on the question of ‘When thinking about sustainability, what are your priorities’, where two aspects are considered, at a personally level, including ‘supporting my family’s basic need’, ‘looking after my health’, ‘leaving an inheritance for my descendants’, ‘achieving a better lifestyle for myself’ and ‘achieving a better lifestyle for my children’ (Figure 5a–e); and at a public level, including ‘conserving the natural environment’, ‘supporting the local economy’, ‘cutting down on waste’, ‘maintaining tradition’ and ‘developing/maintaining a state welfare system’ (Figure 5f–j). It can be seen that at the personal level, there was generally no statistically-significant difference among age groups, except for ‘achieving a better lifestyle for myself’. At the public level, it is interesting to note that three out of the five issues, including ‘cutting down on waste’, ‘maintaining tradition’ and ‘developing/maintaining a state welfare system’, had statistically-significant differences among age groups.

Overall, across age groups, people did think the above issues were priorities, with an average score of 1.57 for the five issues at the personal level and an average score of 1.97 for the five issues at the public level. Compared with the public level issues, the issues at the personal level generally had a higher priority, by about 0.4 on the five-point scale.

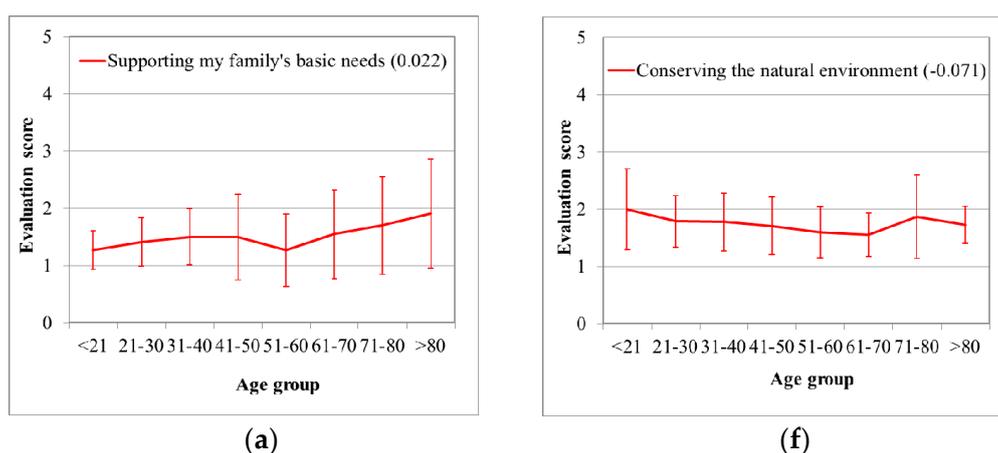


Figure 5. Cont.

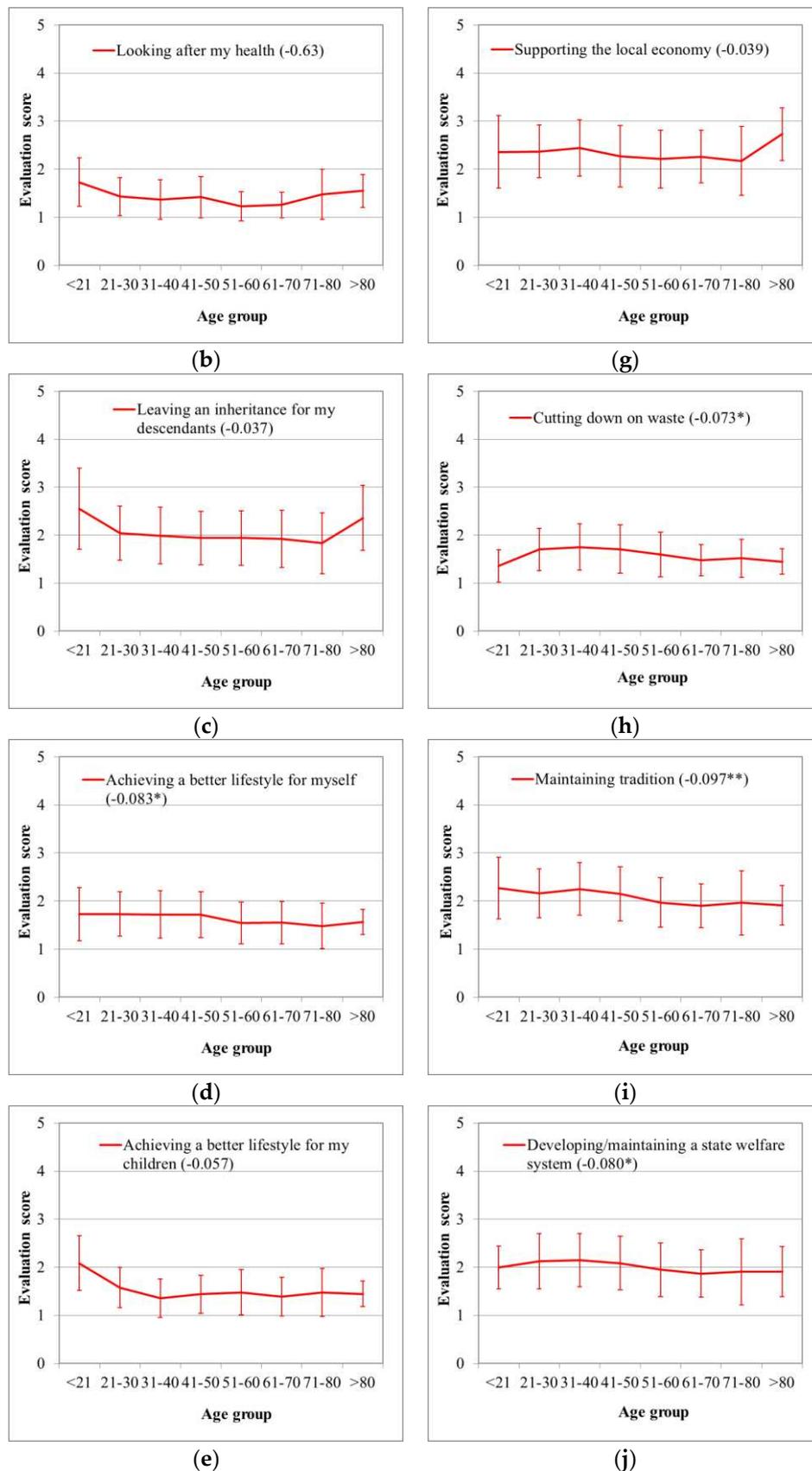


Figure 5. Evaluation results of different age groups on the question of ‘When thinking about sustainability, what are your priorities?’ in terms of supporting my family’s basic need (a), looking after my health (b), leaving an inheritance for my descendants (c), achieving a better lifestyle for myself (d), achieving a better lifestyle for my children (e), conserving the natural environment (f), supporting the local economy (g), cutting down on waste (h), maintaining tradition (i), and developing/maintaining a state welfare system (j).

local economy (g), cutting down on waste (h), maintaining tradition (i) and developing/maintaining a state welfare system (j), where a five-point scale was used, with one as 'a top priority for me' and five as 'not at all a priority'. The numbers in brackets indicate the Pearson correlation coefficient; * indicates that the correlation is significant at $p = 0.05$ level; and ** indicates that the correlation is significant at the $p = 0.01$ level (two-tailed).

A university student in the age group of 21–30 indicated some interesting differences among generations in terms of saving and spending: 'My grandpa would be careful with his spending, Grandpa would save up money on his own, he would donate money to help others in need. But my parents are willing to spend money on themselves, in comparison to my grandpa. I think in terms of spending, I would lean towards my parents.' He also thought that money is important to this quality of life: 'I think it is quite important. Many aspects of our lives need material support. Not money, there is no mention of quality. For instance, when you don't have a lot of money and you want to travel, maybe you can go on a budget tour.'

Another university student in the age group of 21–30 showed her view about the relationships between consumption and sustainability: 'I think a sensible consumption awareness is surely helpful to sustainability, I think awareness is fundamental, and better practice in environmental protection or conservation or harmony comes from a sensible awareness. And in my views, what I call unreasonable consumption is usually caused by people's showing-off mentality, or what can be called herd behaviour, following whatever other people are doing. I think this should be stopped.'

3.5. Preservation for the Future

On the question of 'What is important to persevere for the future', the results are shown in Figure 6, including wealth (e.g., money), property/land, natural resources (e.g., clean air, fuel sources), natural environment (e.g., forests, river and lakes), art and cultural heritage, traditional knowledge (e.g., farming, handicraft skills), traditional values (e.g., moral codes), wildlife and the social welfare system (e.g., medical support system, schools). It is interesting to note that different from the results in the previous sections, as shown in Figures 2–5, in terms of preserving for the future, there is generally no statistically-significant difference among age groups, with the only exception on persevering wildlife, for which with increasing age, people tended to think it was less needed. Overall, all age groups regarded those issues as important to consider, with an average evaluation score of about 1.5–2.1, on a five-point scale with one as 'preservation very much needed' and five as 'not at all needed'.

A university student in the age group of 21–30 indicated: 'As I am specialized in land management, I would talk about sustainability in terms of land pollution, which I know is quite serious now. I think sustainability is a big topic, and it's primarily related to environmental protection, including land management, which is a major issue concerning the environment. When we talk about sustainability, the environmental sustainability is after all a fundamental concern. While consuming natural resources towards current development, we must leave enough resources to future generations to ensure their development. Sustainability in my mind is to maintain a sustainable way of development to ensure that both the current and future needs are met.'

Similarly, another university student also in the age group of 21–30 said that 'I think the first thing we should do is to leave them a good environment, good air quality, so that future generations can still enjoy blue sky with white clouds. Talking about preserving and conserving, I think we should further promote restrained use of all the non-renewable natural resources, We should primarily preserve and conserve for future generations the environment and natural resources.' 'I think sustainable consumption means eco-friendly consumption. Yes, the same concept, except that sustainable consumption may be a little more inclusive. It's more than just about protecting the environment. In other words, apart from the macro environmental considerations, it also involves individual consumption behaviours, like buying things of better quality that can be used longer.'

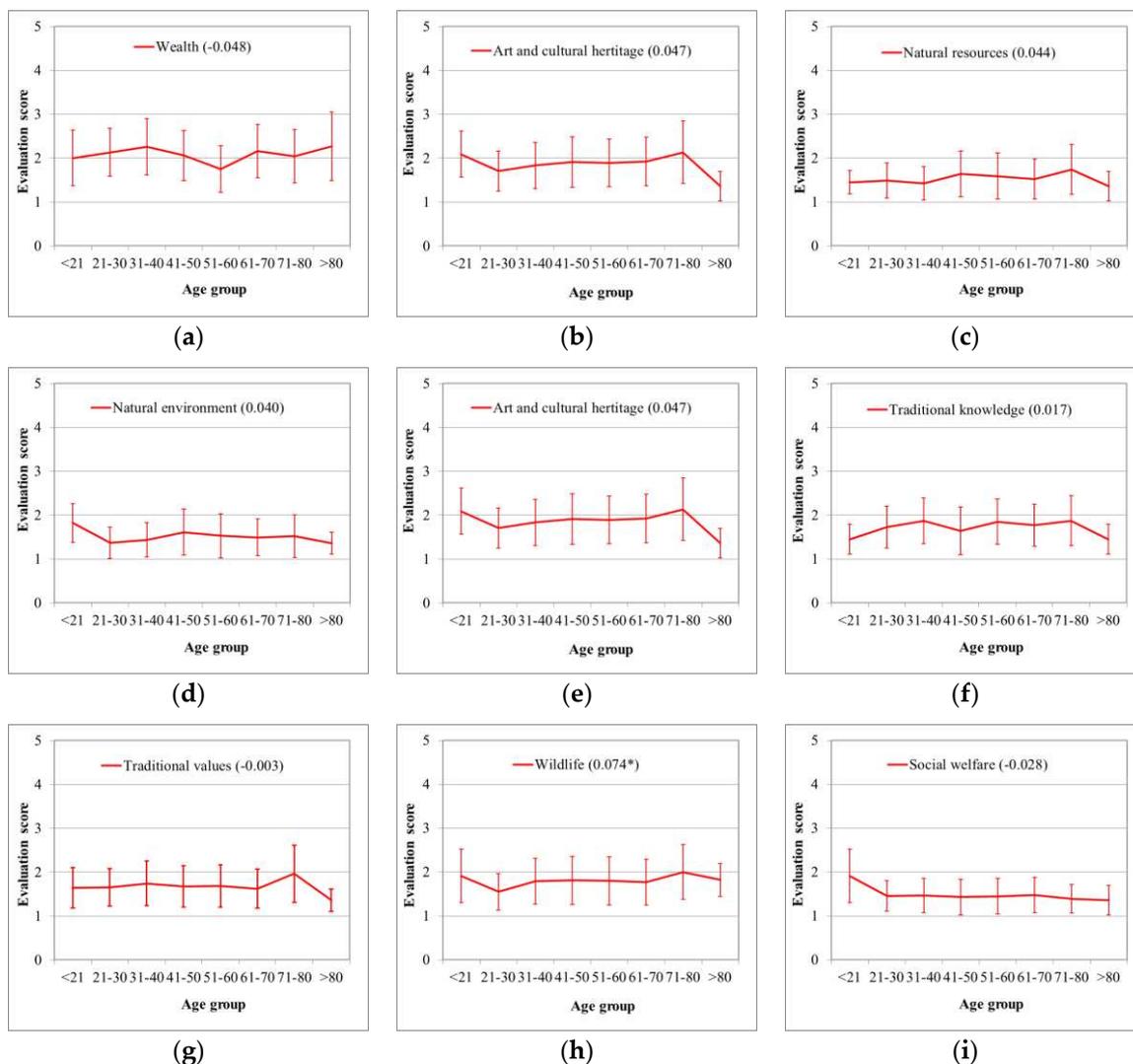


Figure 6. Evaluation results of different age groups on the question of ‘What is important to persevere for the future?’, in terms of wealth (e.g., money) (a), property/land (b), natural resources (e.g., clean air, fuel sources) (c), natural environment (e.g., forests, river and lakes) (d), art and cultural heritage (e), traditional knowledge (e.g., farming, handicraft skills) (f), traditional values (e.g., moral codes) (g), wildlife (h) and the social welfare system (e.g., medical support system, schools) (i), where a five-point scale was used, with one as ‘preservation very much needed’ and five as ‘not at all needed’. The numbers in brackets indicate the Pearson correlation coefficient; * indicates that the correlation is significant the $p = 0.05$ level; and ** indicates that the correlation is significant at the $p = 0.01$ level (two-tailed).

A manager in the age group of 31–40 indicated there should be a good balance between development and environment: ‘I think China has gone through the most challenging development stage, and is going to a more stable development. This is what we call “New Normal” now. . . . Rather than seeking a high-speed growth, we are working toward a quality growth at a medium-low pace, no, at a medium-high pace. The growth curve is not a straight rise, but a slow-down process. Government policies are focusing more on environmental protection, which is a macro change. And you can even feel the change from daily conversations of people in our generation, who are showing more concern for environmental issues. Given these two perspectives, I think I have reasons to be positive about the future.’

A professional in the age group of 71–80 strongly believed the importance of maintaining traditions: ‘As a father and a grandfather, my responsibility is to teach my children to be good people. I will teach them the moral rules and standards of individual conduct, like one should be honest, sincere and civilized. For my sons and daughters-in-law, they should be responsible for raising and teaching their child while working hard. For my grandchildren, they need to study hard and follow their parents’ instructions.’ He also indicated the importance of protecting the environment and saving resources for our children: ‘For me, I will educate my kids. Right? And I will protect and pass down the traditional values, I will teach them to be good.’

4. Conclusions

Based on the results of the questionnaire survey in Nanjing and a series of qualitative studies through in-depth interviews and focus groups, variations among age groups have been analysed in terms of the current situation of sustainability, the cause of the problems, the responsibility for environmental problems, priority considerations in sustainability and preservation for the future. It has been found that generally:

- In terms of the current situation of sustainability, with increasing age, people are more concerned about general and large-scale sustainability issue, whereas for relatively smaller scale and immediate sustainability issues, there is no clear tendency with increasing age;
- In terms of the cause of problems, older generations are more concerned about the causes of climate changes;
- Regarding responsibility for environmental problems, there are statistically-significant view changes with increasing age;
- For priority considerations in sustainability, at the personal level, there is generally no statistically-significant difference among age groups, whereas at the public level, there are some statistically-significant differences among age groups;
- In terms of preserving for the future, there is generally no statistically-significant difference among age groups.

Overall, there are considerable differences in intergenerational justice on sustainability, namely the view of various aspects examined in this study, although there are still indications of solidarity among generations when facing environmental unsustainability, with common judgements across generations, as shown above, both in terms of statistical results and the share of views. On the one hand, such results could have influences on a range of China’s policies on sustainability, for example in terms of school education, pension policy, spending on pollution control and environmental protection and green buildings and cities, as such policies are all concerned, one way or another, about how different generations view sustainability and sustainable development [42]. On the other hand, such results will provide useful evidence for cross-country studies on intergenerational justice and solidarity on sustainability, as the situations in different countries and at different development stages could be rather different. Indeed, given that sustainability is clearly a global issue, global efforts are important.

While the survey was carried out in Nanjing, Yangtze River Delta, the results in this study would be of relevance in other regions in China with similar economic and social development, such as the Pearl-River Delta region, as intergenerational justice and solidarity could be influenced in a similar way. The results are also of relevance for relatively less developed regions in China in the future, as with their future economic and social developments, similar patterns and tendencies may follow in terms of intergenerational justice and solidarity on sustainability and sustainable development.

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