Food Waste Behaviours at Buffet Restaurants in China

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Abstract: Food waste is regarded as one of the most challenging issues in the world today with enormous environmental and socio-economic impacts, especially in China, where food waste produced per capita is estimated to be 44 kg per year. However, a review in literature suggests a lack of empirical studies investigating the motivations, management, legislation, policies, and initiative to decrease food waste in the most populated country in the world (with more than 1.4 billion residents). In this study, we collected data through participant observations, casual conversations, and in-depth interviews with 30 Chinese respondents at three buffet restaurants in Haikou, Hainan Province, a popular holiday destination in China. Findings suggest that food waste was significantly influenced by the misperception of the amount of food that a person expected to be able to eat. Food-saving behaviour was also observed as a result of high moral standards and self-discipline. Specifically, people exhibit a higher likelihood of food waste because of value for money. Patrons’ lack of environmental knowledge is more likely to contribute to wasteful behaviours. We proposed initiatives to reduce food waste at buffet restaurants in the concluding remarks of this paper.

1. Introduction
Climate change and environmental degradation are two of the most challenging issues facing the entire human race [1]. Food waste alone accounts for about twenty percent of global greenhouse gas emissions [2]. In addition, food waste causes serious environmental degradation by polluting water, air and soil. For example, food waste on cruise ships is discharged into the sea, which may be harmful to sea creatures and the marine biota [3].

Tourism and hospitality sectors contribute almost half of the total waste [4]. Tourists, as well as pleasure-seeking patrons recently received attention by environmental researchers as these group of people are commonly observed to have uneaten food left behind on their plate at the end of a meal [5]. Although researchers provide insightful analyses on the food waste behaviour [6,7], motivations behind this behaviour and how to reduce food waste remain under-investigated.

To address the research gap, we carefully designed this study to examine drivers of pro-environmental and wasteful behaviours observed at buffet restaurants in China. We discovered that pro-environmental and food waste behaviours are significantly influenced by moral norms, injunctive norms, health concerns and environmental concerns. These findings are crucially important for restaurant managers to identify means to reduce plate waste.
2. Literature review

Food waste means “unconsumed food” that happens in the food production and consumption stages [8]. Combined with the characteristics of buffet dining, the wasted food comprises not only leftovers by customers, but also served food offerings that are not chosen by customers. It is, therefore, necessary to research the reasons and propose solutions in different directions. For customers, studies have shown that customers with children and tourists from specific countries have obvious buffet waste due to the influence of local culture and living habits [9]. However, there are few articles analysing the reasons for buffet waste in view of customer psychology. For buffet restaurants, a small change can have a large impact on food waste; for instance a restaurant that uses large plates wastes 135% more food than a restaurant that uses a smaller plate [10]. Besides, the ease of access to the serving bowls and the types of prominently displayed food also influence the customers’ eating behaviours [11]. Those arrangements indirectly lead to food waste problems.

The issue of waste disposal of food waste is also worthy of attention. Due to the limitations of technology, facilities and related laws, the disposal of food waste in China does not have the detailed standards and food waste will cause environment problems [11]. At present, there is no research to show that customers’ understanding of the consequences of food waste is related to their eating behaviour. There also are no studies that research whether customers’ understanding of food waste may help buffet restaurants reduce the amount of food waste generated.

3. Method

3.1 Setting

In this study, we adopted a qualitative research methodology. This study focuses on Chinese tourists’ food waste behaviours at buffet Chinese restaurants. Waste of food is prevalent in most Chinese restaurants. As a result, President Xi Jinping recently announced a call to ask that people be mindful when they have meals. Food is a popular theme in Chinese culture, especially for special occasions and festivals [6]. The authors conducted interviews during the National Holiday, which coincided with the Mid-Autumn Festival in the year of 2020, at three buffet restaurants in Haikou, a popular destination for Chinese tourists. The interviews were carried out during breakfast at hotels and during lunch at buffet restaurants.

At the first buffet restaurant, located inside a five-star hotel, nearly all tourists were on holiday. Next, staff revealed that there were approximately 200 tourists dining for breakfast during the National Day holiday period in a University-owned four-star hotel, most of whom were there on business, such as attending conferences, meeting corporate partners, etc. However, the number of travellers dining in the restaurant was lower than normal, which could be a result of the coronavirus pandemic. The third buffet restaurant was found to be most popular, as its price was the lowest and it is located in a business centre. Staff noted that most patrons of the third restaurant are students.

3.2 Data Collection

The authors collected data through participant observation at three buffet restaurants in two separate hotels in Haikou during the National Day holiday period in 2020. At each buffet restaurant, the authors also conducted casual conversations as well as face-to-face interviews with Chinese tourists and staff members. In total, 30 respondents participated in the casual conversation and interviews.

We followed an interview guide that started with the experience of buffet dining, then moved to food waste behaviour within this dining experience and observations of food waste from other tourists, and ended with suggestions on how to reduce food waste in a buffet setting.

When choosing interviewees, we adopted a convenience sampling approach to ensure the quality, credibility, and depth of the data [12]. Since sampling by demographic features such as gender, education level, marital status, income level, etc. is important to maximise variations [13], we took the collected data into consideration when looking for new interviewees. Twenty-five Chinese tourists and five restaurant staff were interviewed.
Semi-structured questions included, “Do you think food waste in this buffet restaurant is serious?” “Where do you think the food waste from the plate will go?” and “How do you think food waste can be reduced in this buffet restaurant?”

As suggested by social scientists [14], we asked follow-up questions to question the motivation and beliefs of the tourists. When respondents talked about their own food waste, we also asked them to describe in detail what they thought and felt. Questions such as “Can you tell us the type of food you could not eat on the plate?” or “Why do you do so?” and “How do you feel about it?”

Over half of the interviewed tourists (16) believed that food waste is a serious problem in buffet restaurants. Among them, seven were males, five from eastern China, 90 percent under 50 years old, and most had a university degree or above.

Interviews were conducted in Chinese, which lasted about 13-68 minutes. The interviews were transcribed in Chinese (simplified). The Chinese transcription were translated into English by the authors. The authors did a back translation to ensure the quality of the translation.

3.3 Data Analysis
We adopted a qualitative approach to analyse the data collected, following the protocols proposed by social scientists [15]. The thematic analysis used in this study involves creating themes, reviewing themes, defining themes, reflecting and producing a report.

The authors developed a separate word document of coding in English. All of the authors were engaged in coding and checking the accuracy and credibility of the work. Further, the authors conducted multiple discussions to refine the codes to the stage where all codes emerged inductively with no disagreement.

The authors used this rule of identifiers to identify each respondent. The first letter represents gender (M for male and F for female). The number adjacent to the first letter corresponds to the restaurant in which the interview was carried out (1 for the five-star hotel buffet restaurant, 2 for the four-star hotel buffet restaurant). We used as “-” to separate the number of restaurant and the correspondent’s age. Another “-” was used to show the region of origin of the respondent. For example, “F1-76-Guangzhou” represents a 76-year-old female tourist from Guangzhou being interviewed at the five-star hotel buffet restaurant. Table 1 shows the list of participants as follows.

Table 1. List of Participants.

| No. | ID       | Gender | Age | Education | Marital Status | City/Province | Income | Occupation          | Restaurant    |
|-----|----------|--------|-----|-----------|----------------|---------------|--------|---------------------|---------------|
| 1   | M1-58-Shandong | M      | 58  | Bachelor  | Married        | Shandong      | 4      | Engineer            | 1 (Breakfast, ¥128) |
| 2   | F1-76-Guangzhou | F      | 76  | Bachelor  | Married        | Guangzhou     | 4      | Retired             | 1 (Breakfast, ¥128) |
| 3   | F1-38-Hubei   | F      | 38  | Bachelor  | Married        | Hubei         | 5      | Housewife           | 1 (Breakfast, ¥128) |
| 4   | M1-30-Hainan  | M      | 30  | Bachelor  | Married        | Hainan        | 3      | Restaurant Manager | 1 (Breakfast, ¥128) |
| 5   | M1-55-Beijing | M      | 55  | Postgraduate | Married      | Beijing       | 4      | Doctor              | 1 (Breakfast, ¥128) |
| 6   | F1-52-Beijing | F      | 52  | Postgraduate | Married      | Beijing       | 4      | Worker              | 1 (Breakfast, ¥128) |
| 7   | M1-52-Shandong | M      | 52  | Postgraduate | Married      | Shandong      | 5      | Entrepreneur        | 1 (Breakfast, ¥128) |
| 8   | M1-43-Hainan  | M      | 43  | Postgraduate | Married      | Hainan        | 5      | University Staff    | 1 (Breakfast, ¥128) |
| No. | Code | Name       | Gender | Age | Major             | Marital Status | Location     | Position                          | Meal       |
|-----|------|------------|--------|-----|-------------------|----------------|--------------|-----------------------------------|------------|
| 9   | F1-31-Hainan | Bachelor   | F      | 31  | Married           | Hainan         | Restaurant Manager        | 1 (Breakfast, ¥ 128)   |
| 10  | F1-23-Heilongjiang | Vocation | F     | 23  | Single            | Heilongjiang    | Hotel Secretary           | 1 (Breakfast, ¥ 128)   |
| 11  | M2-22-Wulumu | Bachelor   | M      | 22  | Single            | Urumqi         | Student                | 2 (Breakfast, ¥ 68)     |
| 12  | F2-21-Chengdu | Bachelor   | F      | 21  | Single            | Chengdu        | Student                | 2 (Breakfast, ¥ 68)     |
| 13  | F2-35-JiLin  | Vocation   | F      | 35  | Married           | Jilin          | Restaurant Chef          | 2 (Breakfast, ¥ 68)     |
| 14  | M2-20-Shandong | Bachelor  | M      | 20  | Single            | Shandong       | Student                | 2 (Breakfast, ¥ 68)     |
| 15  | F2-29-Beijing | Postgraduate | F    | 29  | Single            | Beijing       | Teacher                | 2 (Breakfast, ¥ 68)     |
| 16  | F2-19-Henan   | Bachelor   | F      | 19  | Single            | Henan          | Student                | 2 (Breakfast, ¥ 68)     |
| 17  | F2-34-Hainan  | Postgraduate | F    | 34  | Married           | Hainan         | Teacher                | 2 (Breakfast, ¥ 68)     |
| 18  | F2-24-Hainan  | Vocation   | F      | 24  | Single            | Hainan         | Restaurant Staff         | 2 (Breakfast, ¥ 68)     |
| 19  | F2-20-Shanxi  | Bachelor   | F      | 20  | Single            | Shanxi         | Student                | 2 (Breakfast, ¥ 68)     |
| 20  | M2-46-Henan   | Vocation   | M      | 46  | Married           | Henan          | Civil Servant           | 2 (Breakfast, ¥ 68)     |
| 21  | F3-21-Shandong | Bachelor  | F      | 21  | Single            | Shandong       | Student                | 3 (Lunch, ¥ 68+ ¥ 10 deposit) |
| 22  | F3-19-Hainan  | Bachelor   | F      | 19  | Single            | Hainan         | Student                | 3 (Lunch, ¥ 68+ ¥ 10 deposit) |
| 23  | M3-22-Anhui   | Bachelor   | M      | 22  | Single            | Anhui          | Student                | 3 (Lunch, ¥ 68+ ¥ 10 deposit) |
| 24  | F3-22-Liaoning | Bachelor | F     | 20  | Single            | Liaoning       | Student                | 3 (Lunch, ¥ 68+ ¥ 10 deposit) |
| 25  | F3-21-Heilongjiang | Bachelor | F     | 21  | Single            | Heilongjiang   | Student                | 3 (Lunch, ¥ 68+ ¥ 10 deposit) |
| 26  | F3-21-Chongqing | Bachelor | F     | 21  | Single            | Chongqing      | Student                | 3 (Lunch, ¥ 68+ ¥ 10 deposit) |
| 27  | F3-21-Liaoning | Bachelor | F     | 21  | Single            | Liaoning       | Student                | 3 (Lunch, ¥ 68+ ¥ 10 deposit) |
| 28  | F3-19-Hebei   | Bachelor   | F      | 19  | Single            | Hebei          | Student                | 3 (Lunch, ¥ 68+ ¥ 10 deposit) |
4. Findings
The majority of patrons being interviewed reported observing serious food waste behaviours at buffet restaurants. However, half of the respondents behaved pro-environmentally themselves. We first provided the findings of the underlying drivers for these environmentally-friendly behaviours, and then move on to the factors influencing wasteful behaviours.

4.1. Drivers for Pro-Environmental Behaviours

4.1.1. Moral Norms. Most of the elderly respondents described food as valuable, and scarce. For example, "Food is very precious" (M1-58-Shandong). This respondent described that when he was a child, there was not enough food for his family. No one was allowed to waste any food. He also believed "Wasteful behaviours must be punished, such as paying a fine".

Interviews and observations revealed that they respect the farmers who grew the vegetables and the chefs who made it and, therefore, it would be immoral to waste food. For example, "How much effort should a farmer invest to get this bowl of rice? I cannot turn flour to noodles. Can you? We have to respect workers for their hard work and not waste food." (M1-55-Beijing).

4.1.2. Injunctive Norms. While the first two buffet restaurants (one in a five-star hotel and the other in a four-star hotel) do not punish any wasteful behaviours by any means, the third restaurant charged a ¥10 additional to the price of the meal; this will be forfeited if the patron wastes food. The fine has been found to be quite effective in reducing food waste. A respondent said, "I was told when I entered the restaurant that if I waste food, I will be fined. Therefore, I got well-prepared to get the right amount of food for myself. I don’t want to be punished." (F3-21-Liaoning). However, some respondents did not enjoy the meal as they did not enjoy the experience. For example, "I hate being watched by the waiter while I was having lunch. He is always looking at my plate to see if I waste anything. I do not wish to dine in this restaurant again." (M3-22-Anhui).

4.1.3. Health Concerns. While many male respondents admitted that they would eat more at a buffet restaurant, some of their partners expressed their health concerns, which help them avoid food waste. One female patron disclosed, "I do not go to buffet restaurants often. However, if my friends invited me to go to a buffet restaurant, I will go with them. The amount of food I eat at a buffet restaurant is usually the same as what I have at home. I do not like overeating because it is unhealthy and uncomfortable. It won’t be worthy for me to pay a lot to buy an unhealthy body. Besides, lots of the dishes at a buffet restaurants look oily and fatty. I don’t want to touch it". (F2-20-Shanxi).

4.1.4. Environmental Concerns. The young generation showed more environmental concerns regarding food waste. They worry about the greenhouse gas emissions produced in the life-cycle of the food provided at the buffet restaurant. Some expressed their concerns as follows: "I am aware that when growing the food, a lot of chemical products, such as pesticides will be used, which is bad for the environment. When raising a cattle, it will emit lots of greenhouse gases. If I waste the food in my
plate, those emissions or pollutants are already impacting the environment. I won’t allow myself to harm the environment." (F3-19-Hebei).

4.2. Wasteful Behaviours
Multiple factors, including value for money, conspicuous consumption, misperceived capabilities and lack of environmental knowledge contributing to food waste behaviours were identified via interviews and observations. We will show our findings with evidence as follows.

4.2.1. Value for Money. A third of the respondents believed that they need to take a lot food on their plate to get value for money. As a result, some of the food taken on the plate was wasted due to this behaviour. One respondent revealed, "In order to eat more at a land buffet, I usually skip breakfast." (F3-21-Shandong). And another respondent admitted, "There are so many desserts to try in a buffet. I just wanted to try all of them. I know I can't finish it, but I paid the buffet so I should enjoy the right of tasting.” (F2-29-Beijing).

4.2.2. Conspicuous Consumption. A common theme of wasteful behaviour is conspicuous consumption. This phenomenon does not only apply to the wealthy class, but also could apply to other economic classes. One of the young couples interviewed responded, "I like taking photos of the dishes and beverage. They look exquisite and luxurious. I'll send the photos to my friends so they know my boyfriend and are having a great time on our holiday." (F2-29-Beijing). From field observations, the authors noticed that many young couples left quite a beautiful plate of food, accompanied by colourful beverages, on their table after they finished meals, which may be enough for another couple to eat.

4.2.3. Misperceived Capabilities. The buffet restaurants offer a wide variety of food. The food is often put in big containers for patrons to take. Many respondents expressed that it was not their intention to waste food. However, they have difficulty in accurately estimating how much they can eat and how much to take when facing many choices.

For example, a respondent recalled, "I had one pepper which is really spicy, so I grabbed two big glass of juice. Then I was no longer able to finish the food in my plate because the juice took up the place in my stomach." (F3-21-Shandong). Another revealed, "I took another serve of the chicken because I enjoyed it so much! When I started having the second serve, it did not taste as good as the first one. My stomach began to feel disturbed." (M2-20-Shandong). Some suggested buffet restaurants allow leftovers be taken at home to reduce waste.

4.2.4. Lack of Environmental Knowledge. Contrary to pro-environmental behaviours, people who are more likely to waste food showed a lack of environmental knowledge. When asked the question: "Do you think food waste will have any impacts on the environment?", some admitted that they never thought about the question and are not aware of the consequences of waste disposal on the environment. One mother with her eight-year-old son said, "I only worried about the money spent on food, but it never occurred to me how the food waste will be managed." (F1-38-Hubei). One father with his six-year-old daughter said, "I believe that the restaurant has dealt with the wasted food properly. It's not my job to worry about how to dispose the food waste." (M1-43-Hainan).

5. Discussion and Conclusion
Tourists and patrons hold different values, beliefs, norms and concerns, which lead to their differing behaviours. For instance, most older patrons hold the belief that food is precious so they do not exhibit wasteful behaviours, whereas the younger generation does not have this belief and, therefore, were recorded wasting more at buffet restaurants.

This study explores food waste - a common existing in the tourism and hospitality sectors. It extends our knowledge of factors influencing pro-environmental behaviours and wasteful behaviours in a buffet setting. Previous research has not fully investigated the underlying psychological and
behavioural reasons for food waste behaviours and, therefore, this study offers new insights in this area.

To promote environmentally-friendly behaviours and reduce waste, buffet restaurants could provide more information on the environmental impacts of food waste. Government could introduce a fining system imposed on every buffet restaurant to give a monetary penalty to patrons wasting food.

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