

Article

Leftover Consumption as a Means of Food Waste Reduction in Public Space? Qualitative Insights from Online Discussions

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Abstract: A considerable amount of food is discarded in canteens every day. This waste has created a countermovement, where groups of mainly students purposefully choose to eat other consumers' plate leftovers instead of buying fresh meals. This phenomenon highlights two opposing narratives: leftovers as food waste versus leftovers as edible food resources. Using a thematic analysis, we investigated 1579 comments from German news sites and their corresponding Facebook sites related to this countermovement. Thereby, we aim to better understand what consumers associate with the consumption of other consumers' plate leftovers. Our study demonstrates that the consumption of plate leftovers is shaped by the regulatory, normative, and cultural-cognitive system. Furthermore, associations with the consumption of plate leftovers depend on whether this food decision is perceived as a collective or individual consumer decision. From a consumer movement perspective, food leftover consumption is associated with a sense of community and food waste reduction for idealistic or environmental and social reasons. From an individual consumer behavior perspective, food leftover consumption is associated with satisfying hunger but considered a threat to health and social order. Our findings can inspire food service organizations to develop targeted interventions for plate leftover reduction.

Keywords: food waste; plate leftovers; food sharing; food service; motivation; qualitative study



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1. Introduction

1.1. Relevance of Food Wastage Reduction in Food Service Organizations

Worldwide, approximately 1.3 billion tons of edible food are thrown away every year, corresponding to roughly one-third of all the food produced for human consumption [1]. A recent study of the United Nations Environment Programme [2] suggests an even higher amount of food wastage grounded in an underestimation of the consumption level (i.e., households and food service). According to the study, every year, around 931 million tons of food are disposed of by retailing, food service, and households alone.

In the EU-28, households, processing, and food service are the three main drivers of food wastage along the food supply chain [3]. Looking at the disposal of all food resources (i.e., edible and inedible or avoidable and unavoidable food wastage), the largest amount of food wastage occurs in households, followed by processing and the food service industry [3–5]. For Germany, Schmidt et al. [6] estimate that around 6.14 million tons (52%) of food are wasted in households, 2.17 million tons (18%) are lost in processing, and 1.69 million tons (14%) are lost or wasted in the food service industry. However, if, in contrast, only the disposal of edible food resources or avoidable food wastage is considered, the order of the main drivers of food wastages changes. While households remain the main contributor to avoidable food waste, the second-largest contributor to avoidable food waste is then the food service industry, including canteens and restaurants [4]. This pattern is also evident in other studies [5,6] and illustrates that both households and the food service industry represent an important stage with a high potential for reducing avoidable food waste.

Beretta et al. [4] extend this perspective by integrating the sector's relevance on total food consumption. They show that while the share of avoidable food waste for the food service industry based on an input-output calculation is 13.5%, the share of total avoidable food wastage is 5%. This calculation is based on estimates that only 15% of food is consumed in the Swiss food service sector, whereas 85% is consumed in the household. For Germany, the food service industry is likely to have a similar relevance. According to a representative survey, 16% of consumers say they eat out in a canteen at least once a week, whereas 64% state that they never eat in a canteen [7]. The relevance of food consumption for food wastage is also reflected in a study from China. Here, the household accounts only for about 4% of the total food wastage compared to out-of-home consumption, with a share of about 13% [8]. The authors attribute the high amount of food waste in out-of-home consumption and the relatively small amount in households compared to other countries to the relevance of out-of-home consumption in China and consumption traditions (e.g., overordering as a sign of hospitality).

In the food service industry, the kitchen (e.g., storage and preparation), serving, and consumption stages can be differentiated [9]. In the production and serving of meals, overproduction due to difficulties or errors in forecasting demand [10,11] and portion size [11,12] are perceived as the main drivers for avoidable food wastage. Plate waste in out-of-home settings can occur for many reasons, related to both situational and personal factors. Situational factors result from the underlying system structures, including the quality of the food and the portion size [12–14]. Furthermore, additionally served side dishes and the ambiance (e.g., noise level, person density, lighting conditions) can also influence the amount of plate leftovers [15]. Personal factors that influence the amount of plate leftovers include consumers' intentions to avoid leaving food on the plate and, relatedly, their attitude toward plate leftovers, subjective norms, and the perceived behavioral control over the occurrence of plate leftovers [14]. Additionally, perceived time pressure while eating can contribute to the amount of plate leftovers [15,16].

While some studies show that plate leftovers in the consumption stage account for a smaller proportion of the food wasted [11,17,18], other studies show that plate leftovers account for most of the food wasted in out-of-home settings such as canteens [9,15,16]. These varying results may occur because of different assessment methods or infrastructural differences in the organizations investigated [9]. However, all these studies agree that plate leftovers are an issue. Since plate leftovers are mainly avoidable [12], they represent a great potential for reducing food waste in canteens. In addition, prevailing hygiene standards can make it difficult to further reduce food loss in preparation and storage; in contrast, reducing avoidable plate leftovers is achievable [16]. Furthermore, as the final stages in the food supply chain, food that is disposed of in households or in the food service industry and here, especially, plate leftovers already involve many other resources from the production process that are also wasted [4]. This means that these stages are also particularly relevant from an economic point of view, which is, for example, reflected in the higher cost of food wastage in the food service industry compared to earlier stages of the food supply chain (e.g., food service: EUR 3148 and processing: EUR 1490, per ton of edible food wastage [3]).

Unquestionably, food wastage is undesirable, from not only an economical viewpoint but also social and ecological angles. While large amounts of food are lost and wasted, worldwide around 690 million people suffer from hunger [19]. Furthermore, all resources invested in the production of lost and wasted food items are disposed of as well. For example, when a food item rots on the field, far fewer resources are invested than when the same food item has gone through all stages of the food supply chain but is ultimately disposed of by the consumer [4]. This means that by reducing food wastage, especially at the consumption level, production factors that can harm the environment (e.g., the use of pesticides, fertilizers) can be reduced, and resources such as water can be spared [20]. Avoiding food wastage could also save nearly 30% of the world's agricultural land area, thereby preventing the destruction of further biotopes and preserving biodiversity [21].

In addition, food wastage is estimated to account for the equivalent of 3.3 Gtonnes of CO₂, a significant contribution to global warming [21]. Furthermore, from an economical perspective food wastage costs society around USD 2.6 trillion worldwide every year; with USD 700 billion of societal costs for the environmental impact of food wastage, USD 1 trillion economic costs, and USD 900 billion for the social impact of food wastage in terms of individual well-being [22]. Due to the far-reaching consequences of food wastage for sustainable development, the United Nations has established reducing food wastage by 2030 as one of its Sustainable Development Goals (SDG 12.3) [23].

1.2. Conceptual Understanding of Food Wastage in Food Service Organizations

So far, however, there is no common ground in the understanding, definition, and classification of food wastage [24–29], which complicates the comparability of results [24,28,30]. The differences in definition and classification refer, for example, to process-based delineations according to the point of food disposal in the food supply chain [26], or delineations according to the edibility perception [30] and avoidance potential of food wastage [31].

While some authors refer to the disposal of food along the entire food supply chain as food waste [26,30–32], other authors differentiate between food loss and food waste depending on the point of food disposal in the food supply chain [1,29,33]. Although every food resource that leaves the food supply chain can be understood as lost and, thus, wasted, which would obviate the need for a distinction based on the point of disposal [26], we assume that such a distinction can provide a clearer conceptualization of food disposal. Therefore, we refer to food loss for discarded food in the early stages of the food supply chain (i.e., agricultural production, post-harvest and storage, and processing or preparation) and food waste for discarded food in later stages of the food supply chain (i.e., retailing or food service and consumption) [29]. Furthermore, we use the term food wastage proposed by the FAO [21] as a summarizing conceptualization for food loss and food waste. For food service organizations, a further conceptual differentiation of food wastage can be made according to the stages kitchen (e.g., storage and preparation), serving, and consumption [9,11,34]. Kitchen loss refers to all disposed food that occurs in the kitchen of food service organizations [18]. This includes, for example, food that is discarded due to improper or excessive storage, food disposal during preparation (e.g., peeling residues), or food that has been prepared but not served and disposed of (i.e., kitchen leftovers) [12,16]. While kitchen leftovers did not leave the kitchen and were not served, serving waste refers to all the food that was served to customers but did not reach their plates [9]. This includes, for example, all leftover food from buffets or serving bowls [12,16]. The distinction between kitchen leftovers and serving leftovers is particularly relevant from a regulatory perspective. Food safety and hygiene regulations in some countries (e.g., Germany) stipulate that food that has been served once or come into contact with guests cannot be further used and must, therefore, be disposed of [35]. The same applies to plate waste, which refers to all waste from consumers' plates [12,16]. Besides food scraps, this also includes inedible parts such as bones or napkins [9]. To distinguish between food and non-food parts (e.g., napkins) of plate waste, we use Silvennoinen et al.'s [18] (p. 141) denomination "plate leftovers" for all leftover food from plates. We also refer to leftovers as food that is surplus but does not automatically equal waste.

The transition from food surplus (i.e., food that is still "fit for human consumption") to food wastage (i.e. food that is "unfit for human consumption") is closely linked to the perception of edibility [36] (p. 113). Surplus food is food that no longer serves its original purpose, but is generally still fit for human consumption [37]. It thus includes, for example, kitchen leftovers, serving leftovers, and plate leftovers. Furthermore, Kantor et al. [38] differentiate, here, between recoverable and not recoverable food surplus for human consumption. This understanding is reflected in the reuse option for human consumption in the food waste hierarchy of Papargyropoulou et al. [36]. If food surplus cannot be prevented, the second step should be to reuse or redistribute it [36]. However, for different reasons, not all surplus food items are suitable for reuse [38]. While, for example,

in households plate leftovers can be used by consumers for the preparation of other dishes [39,40], in many countries the reuse of plate leftovers by food service organizations is not allowed due to health and hygiene requirements [38]. However, consumers can take their plate leftovers home for later consumption [35,38]. This actor-related divergent understanding of when plate leftovers are considered food waste vividly shows that there is no common understanding of edibility. Moreover, perceptions of edibility often vary from country to country and even between individual consumers [41], and depend, for example, on cultural, normative, or personal preferences [36].

A similar pattern can be observed in perceptions of the avoidance potential of food wastage. The potential of food wastage avoidance refers to the perception of the feasibility of food wastage prevention [36]. However, while the understanding of what is avoidable food wastage (i.e., “food and drink thrown away that was, at some point prior to disposal, edible (e.g., slice of bread, apples, meat),” [31] (p. 4)) is widely consistent, the classification of food wastage as possible avoidable (i.e., “food and drink that some people eat and others do not (e.g., bread crusts), or that can be eaten when a food is prepared in one way but not in another (e.g., potato skins),” [31] (p. 4)) or unavoidable (i.e., “waste arising from food or drink preparation that is not, and has not been, edible under normal circumstances (e.g., meat bones, egg shells, pineapple skin, tea bags),” [31] (p. 4)) is less clear [27]. The discussed definitions and terms are summarized in Figure 1.

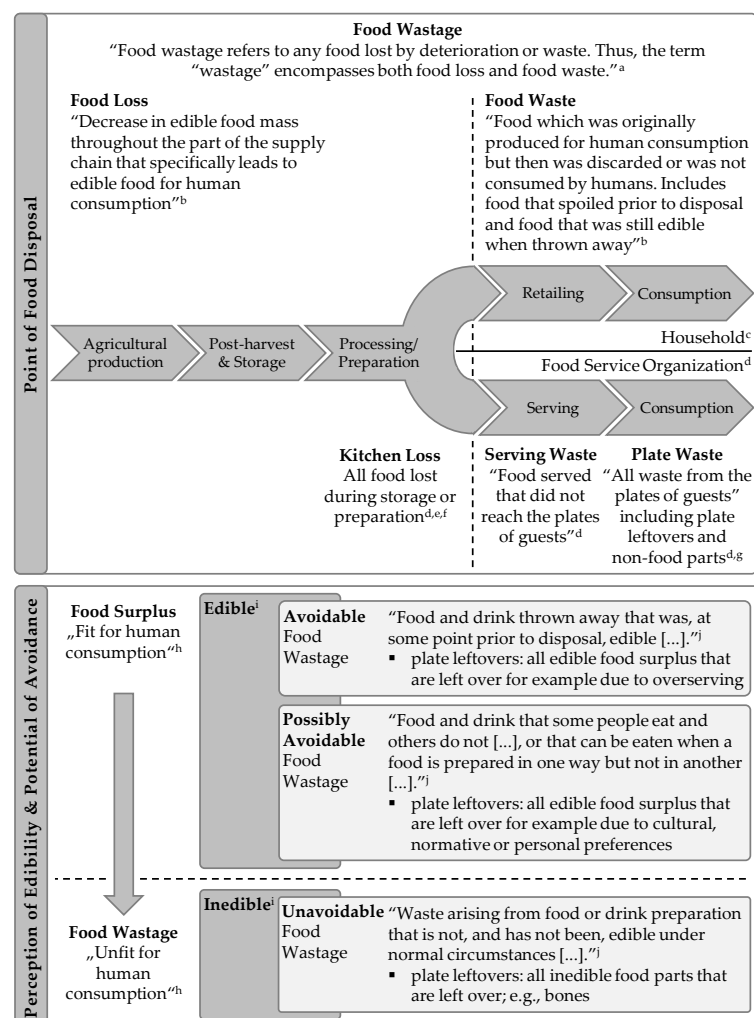


Figure 1. Overview of food waste definitions and related terms. (Sources: ^a FAO [21] (p. 9); ^b Thyberg and Tonjes [29] (p. 112); ^c Porpino et al. [33] (p. 620); ^d Malefors et al. [9] (p. 4); ^e Engström and Carlsson-Kanyama [16]; ^f Betz et al. [12]; ^g Silvennoinen et al. [18]; ^h Papargyropoulou et al. [36] (p. 113); ⁱ Andrews et al. [37]; ^j Quedsted and Johnson [31] (p. 4).)

1.3. Consumer Movements Stressing the Reuse of Food Surplus

A group of students at the University of Freiburg (Germany), who call themselves “Bänderer”, have deliberately challenged the understanding of plate leftovers as waste: instead of buying fresh dishes prepared by the canteen, they eat food that previous canteen visitors have left on their plates and placed on the canteen’s tray return belt [42]. This activity is aptly called “Bändern”, from the German word for the belt on which the used trays are returned to the canteen’s kitchen. The “Bänderer”-phenomenon has recently received media attention in Germany, although our analysis shows that it is not a new phenomenon and can be observed at other universities as well.

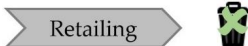
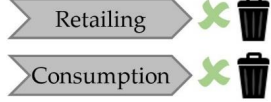

Similar consumer movements that address reducing food wastage are dumpster diving and “Foodsharing,” a German movement that has its origin in dumpster diving [43]. All three consumer movements aim to reuse food that otherwise would be wasted. However, the redistribution or rescue of food takes place at different points in time in the three movements. While in the case of Foodsharing and Bändern, the redistribution of food takes place before it is disposed of in a waste container, in the case of dumpster diving, the redistribution of food takes place after it has been disposed of in a waste container. For this purpose, Foodsharing offers a platform for the exchange of food between food retailers and consumers as well as between consumers; its purpose is separated from charity and the commercial distribution of food [44]. Foodsharing aims to connect actors that want to work together against food wastage [44]. Whereas dumpster diving involves taking food out of retailers’ waste bins without their permission, Foodsharing members collaborate with food retailers and receive food that is no longer saleable free of charge [43]. In contrast to dumpster diving, which legally constitutes theft in Germany, and Foodsharing, which is carried out following legal requirements, Bändern constitutes a regulatory grey area. Crucial here is the understanding of when the property rights of the food are transferred and between whom. According to current EU food law, when placing food on the market, protecting human life and health is highly prioritized [45]. Therefore, “food shall not be placed on the market if it is unsafe” (Article 14.1 [45]). Since food safety cannot be guaranteed by the food service organization for plate leftovers, it is, therefore, not possible for the food service organization to pass on such food, for example, to charitable organizations [35]; instead, the food service organization must dispose of this food professionally because the food is the legal property of the organization, and the organization is, therefore, responsible for guaranteeing food safety.

However, the food service organization’s legal responsibility is less clear for the consumption of other consumers’ plate leftovers in their facilities. While food service organizations usually tolerate direct sharing between consumers, it is unclear whether this should apply to plate leftovers taken from the canteen’s tray return belt. If one assumes that depositing one’s tray on the tray return belt is equivalent to transferring property rights from the consumer to the canteen, then the food service organization would be legally responsible for the plate leftovers. The canteen at the University of Freiburg has made this assumption and officially prohibited Bändern for hygienic and legal reasons [42]. However, the canteen recommended direct sharing between consumers [42].

Foodsharing members are motivated by the active reduction of food wastage, raising awareness of the overall problem of food wastage, and sensitizing consumers that food items intended for disposal are often still edible and of value [46]. Furthermore, the personal and financial benefits from access to free food are also a motivator to participate in Foodsharing [47]. Similar motives drive dumpster diving. Besides economic motivators such as access to free food, dumpster divers often also have ideological motivators such as reducing food waste and psychological motivators such as experiencing satisfaction and the stimulation brought on by committing an illegal act [48]. In contrast to Foodsharing members, dumpster divers consciously accept a violation of legal regulations that oppose the prevailing market and social system [43]. Bändern has a common aim with Foodsharing and dumpster diving: to reduce food waste. Like Foodsharing members, Bänderer also want to raise awareness about the problem of food waste and sensitize consumers for the

edibility and value of plate leftovers intended for disposal [42]. Nevertheless, depending on the approach taken (direct transfer of plate leftovers between consumers vs. removal of plate leftovers from the canteen's tray return belt), the Bänderer act in a legal grey area. In contrast to Foodsharing, Bänderer do not actively cooperate with the responsible food service organizations. Rather, the behavior here is similar to dumpster diving in that it opposes the food service system. Fundamentally, Bändern is different from Foodsharing and dumpster diving in the type of food saved: dumpster diving and Foodsharing usually involve food that is still packaged or mainly untouched by consumers. Bänderer, in contrast, eat plate leftovers that have had direct contact with another consumer who left them as waste shortly before. The main characteristics of the three different consumer movements are summarized in Table 1.

Table 1. Dumpster Diving, Foodsharing, and Bändern.

Characteristics	Dumpster Diving	Foodsharing	Bändern
Description	"Dumpster diving involves entering a commercial or residential dumpster [...] to retrieve rubbish." [48] (p. 1779)	"Foodsharing [...] is a community platform in Germany that enables consumers, farmers, organizations and retailers to offer and collect food articles to save them from being wasted" [49] (p. 912)	Bänderer purposefully choose to eat other consumers' plate leftovers instead of buying fresh meals.
Food Waste Hierarchy Option	Reuse	Reuse	Reuse
Consumption Context	Private (Household)	Private (Household)	Public (Food Service)
Time of Food "Rescue"			
Type of "Rescued" Food	Surplus Food	Surplus Food	Plate Leftovers
Compliance with German Legal Requirements	Contempt of Legal Requirements	Following Legal Requirements	Legal Grey Area

Studies investigating the potential of food wastage reduction through food sharing show varying results [50,51]; the underlying subject of the studies might explain these discrepancies. A consumer movement such as Foodsharing involves consciously choosing to share food to reduce food wastage. However, consumers may have other motives, such as the food item's sensory appeal and health aspects [52], which might be more relevant for the food choice. In a similar vein, Morone et al. [50] show that the motivation to share food is related to such influencing factors as environmentally friendly behavior, awareness of environmental and economic benefits, and collaborative behavior. Lazell [51] builds on the idea of sharing food to reduce food waste and investigates the intervention of a social media tool to enable food sharing in a university environment. Even though the sharing tool was generally viewed positively, it failed to have the desired effect for several reasons, such as uncertainty about the safety of food items and mistrust due to a lack of social ties between the donator and the recipient. Miller et al. [53] similarly show that food sharing is associated with a personal relationship. Another barrier Lazell [51] found was the culturally determined normative understanding of food wastage: consuming food that is theoretically still edible but has already been declared as food wastage is perceived as socially unacceptable and shameful to consume. Therefore, the author concludes that recovery of food already considered food wastage is not a socially accepted procedure.

We assume that the discrepancy in willingness to share or eat food is even more pronounced when the shared food is the plate leftovers of another consumer. Two perspectives

on plate leftovers thus emerge: plate leftovers as waste versus plate leftovers as an edible option. With our study, we aim to understand this discrepancy better. To do so, we address the following research question: what do consumers associate with the consumption of other consumers' plate leftovers in public space?

Using an explorative quantitative study approach, we investigated 1579 comments from German news sites and their corresponding Facebook sites discussing the Bänderer phenomenon of consuming other consumers' plate leftovers. By capturing the different consumer perspectives, we aim to create a comprehensive understanding of the consumption of other consumers' plate leftovers. In doing so, the goal of this paper is explicitly not to introduce the consumption of other consumers' plate leftovers as an intervention to reduce food waste in canteens. Instead, the goal is to use this intervention that has emerged from a consumer movement to learn more about consumers' understanding of, and relationship with, plate leftovers.

While a few studies investigate the consumption of leftovers within the family context e.g., [39,54,55], our paper is, to the best of our knowledge, one of the first that investigates the Bänderer phenomenon. Other studies that analyze sharing surplus food in an out-of-home setting did this either in the context of a consumer movement, e.g., [43], or considered it an individual consumer behavior, e.g., [51]. Thus, our data offer the opportunity of an integrated approach that enables us to investigate the sharing of plate leftovers within a consumer movement and as an individual consumption behavior. Moreover, this allows us to address interactions between these two perspectives.

Gaining a better understanding of the consumption of other consumers' plate leftovers in public space can be relevant for several reasons. On the one hand, although the health risk of consuming plate leftovers from a healthy consumer can be perceived as relatively low for a healthy consumer in principle, the coronavirus pandemic has shown how quickly contagion can reach global dimensions. In this context, it must also be emphasized that infectiousness can already exist during the incubation period, i.e., without the consumer noticing any signs of illness (e.g., for SARS-CoV-2; [56]). As a side note, our data collection took place before the COVID-19 outbreak, and thus food-related regimes to contain the pandemic were not included in the data.

On the other hand, considering the substantial amount of resources necessary to produce and prepare meals, avoiding the disposal of meals at any point of consumption has particular social, ecological, and economic relevance. Moreover, it is the last possible point where these food resources can still be preserved for human consumption. Furthermore, a better understanding of plate leftovers can help food service organizations to develop well-founded actions against food waste at the consumption stage.

2. Materials and Methods

Since little is known about the consumption of other consumers' plate leftovers, we used an exploratory qualitative research design to address our research question. Furthermore, to understand in depth the subjective meanings of other consumers' plate leftover consumption in the context of out-of-home consumption, we followed the interpretivist research paradigm in our analysis and interpretation [57].

2.1. Data Source

The phenomenon of Bändern has attracted media attention in Germany; therefore, we used comments from online news media sites and their corresponding Facebook sites as a data source for our analysis. We adopt a passive analysis approach, observing discussions without interacting with the participants [58]. This analysis approach allows direct and undisguised insights into the participants' perspectives [59]. Furthermore, online comments are ideal for drawing a broad and multifaceted picture of the research topic because the participants' perspectives are varied [59].

We collected online comments in a stepwise process. In the first step, we systematically searched the news aggregator website Google News for articles about the Bänderer

phenomenon. Next, we used the search function on the news media sites on which these articles appeared. Finally, using a snowball principle, we searched for articles that were made reference to within the articles from the previous steps. We excluded articles that had no comment function on the news media sites or had no comment(s) on the news media sites or Facebook sites. Twenty-seven articles from fourteen news media formed the basis for our analysis: three articles were exclusively published on the news media sites, eighteen articles were exclusively published on the Facebook sites, and six articles were published on both the news media sites and Facebook sites. Of the six articles, one was published twice on the corresponding Facebook site within a period of one month. Furthermore, the same article was used as a reference from another news media on its Facebook site. In total, this results in 35 different data sets (9 news media site data sets, 26 Facebook site data sets). The news articles were published between March 2016 and December 2019, with 23 articles appearing in 2016, 2 articles in 2017, 1 article in 2018, and 1 article in 2019. Most of the articles are about the Bänderer phenomenon at the University of Freiburg, although some address the phenomenon at other universities in Germany, such as Leuphana University Lüneburg. The phenomenon was reported in the online offerings of local (e.g., *Badische Zeitung*) and national (e.g., *Süddeutsche Zeitung*) news media.

Both media channels showed a high amount of comments that were mostly on topic. After removing 13 off-topic comments (8 comments on different pizza toppings, 3 comments on technical aspects of the news platform, and 2 comments on the columnist), our final data set consists of 1579 comments with the first comment posted on 11 March 2016 and the last comment posted on 23 December 2019. Of the 1579 comments, 471 comments were posted on the news media sites and 1108 comments were posted on the Facebook sites. The Facebook comments can be further differentiated into comments consisting of text with or without emojis and/or tags to other Facebook users (907 comments), emojis only (22 comments), tags only (134 comments), or emojis and tags but no text (45 comments).

2.2. Participants

Due to our study design, it is difficult to provide information on the commentators' sociodemographic characteristics, especially without violating ethical guidelines for handling online comments. However, to better understand the interaction structure of the discussions, we analyzed the share of comments for individual commentators on the overall discussion. While a few commentators were heavily involved in the discussions for both channels, most of the commentators only posted one or a few comments (see Appendix A). Although a similar picture emerges for the news media site and Facebook site interactions, it may be slightly distorted for the news media site interactions; this might be due to the option on some news media sites to enter a new nickname for each new post. However, this, in turn, can increase perceived anonymity of the comments, which, as Chen and Berger [60] show, can reduce discomfort with a controversial topic and, thus, increase interaction. The moderating effect of anonymity could also have been decisive for our comments. While the total number of comments was higher on the Facebook sites compared to the news media sites, the average number of comments per data set was higher for the news media sites ($M_{NewsMedia} = 52.33$ comments) compared to Facebook sites ($M_{Facebook} = 42.62$ comments). This is in line with the study of Hille and Bakker [61], showing a higher number of comments on news media sites compared to their corresponding Facebook sites. Moreover, the comment's word count was also higher on news media sites ($M_{NewsMedia} = 66.39$ words) compared to Facebook sites ($M_{Facebook} = 20.27$ words).

2.3. Ethical Considerations

Our data collection, analysis, interpretation, and reporting are guided primarily by the ethical guidelines for internet-mediated research published by The British Psychological Society [62]. These guidelines require an understanding of online communication as private or public to make well-founded decisions about the treatment of online data. We consider the data public because all comments are publicly available on the news media sites

and Facebook sites, and no additional registration was necessary to read the comments. Furthermore, the news media sites are not topic specific but are mass media accessed by a broad public. Therefore, they have an extensive community that can read and comment on the articles publicly.

For anonymization of the comments, we first copied the comments manually from the news media sites and Facebook sites into Word documents. Next, we deleted profile links to remove the direct link between the comments and the commentator profiles. Finally, for the reporting, we replaced all profile names and nicknames with numbers. We opted not to use randomized names because they can lead to gender discrimination, considering we have no information about the demographic data of the commentators. Furthermore, the translation of the quotes used in the paper represents an additional step of anonymization.

Since we used a retrospective observational analysis approach, we remained anonymous during the data collection because no direct interaction between the researcher and the commentators occurred. The data, therefore, represented the commentators' unfiltered opinions. However, with an interpretivist research approach, the researcher themselves is part of the data interpretation [57]. For example, one author could hardly fathom eating plate leftovers of any sort, while the other was more positive about consuming other consumers' plate leftovers. These diverse views allowed for an open-minded interpretation of the data. Discussions made it possible to understand each other's opinions and thereby enrich the interpretation of the data.

2.4. Analytical Process

We analyzed the comments using the thematic analysis proposed by Braun and Clarke [63]. The thematic analysis is an analytical framework that enables the systematic identification, analysis, and reporting of patterns [63]. We have chosen the thematic analysis because we are interested in the meanings and the different facets consumers associate with the consumption of other consumers' plate leftovers. Our goal here is not to present the relative importance of each construct (e.g., through frequency analysis) but rather to display the diversity of different perspectives and create an overall picture of the associations with the consumption of other consumers' plate leftovers by integrating the context. In our analysis, we followed the six phases of the thematic analysis, going back and forth between the phases until we reached an overall fit between our data set and our coding system (see Appendix B).

In the first step of familiarizing with the data [63], the first author and a trained research assistant read the articles and comments independently, making initial notes. In the second step of searching for initial themes [63], we developed codes using an inductive approach. Codes represent the smallest unit of meaning; they are closest to the original commentary and reflect the individual facets of meaning [64]. The inductive approach enabled us to remain open-minded about understanding the phenomenon in a broader context. The inductive approach is a data-driven approach, in which codes are generated from the data, which allows for openness to the research subject and, thereby, does not exclude facets of the phenomenon under study by predefined codes [63]. After the first author re-reads all articles and cross-checks them with their notes from the first step, the first author develops the first draft of a code system. This first draft was given to the trained research assistant, who compared it with their notes from the first step. In a follow-up discussion, all codes were discussed, and adjustments and additions were made. In the fourth step of reviewing themes [63], we independently coded the comments based on the revised central code system. We evaluated and coded comments manually to search for patterns, conflicting views, and exceptional cases. The investigation was technically supported by MAXQDA 2020 (Release 20.4.1 VERBI GmbH, Berlin, Germany), a computer-assisted qualitative data analysis software that assists with coding, aggregation, visualization, and analysis of qualitative data [65]. We used MAXQDA mainly to assign comments manually to single or multiple codes within the codebook. Building on this analysis, we discussed the coding and the overall fit of the code system again. Finally,

to develop the overarching story of the themes and a solid understanding of the sub-themes [63], we aligned our final coding with existing theories. Themes are overarching abstract patterns that summarize codes and have salient meaning for the research question; not in a quantifiable way, but rather in terms of content [63].

For the direct associations with the consumption of other consumers' leftovers, a content fit of our main- and sub-codes with Maslow's needs categorization [66,67] was found. In its original form, Maslow's Hierarchy of Needs ranks five universal needs: physiological, safety, love and belongingness, esteem, and self-actualization [66,67]. The extended version of this hierarchy adds self-transcendence as the highest level [68]. The goal of attaining these needs motivates people to act [69]. According to Maslow [69], the first four needs represent deficiency needs necessary to experience satisfaction. Self-actualization needs and self-transcendence needs represent growth needs [68,69]. These needs are not motivated by compensating for a deficit in need satisfaction but rather by the need for development and personal growth [69]. Even though the theory has often been criticized for lack of empirical evidence and conceptualization as a causal hierarchical process of satisfying needs [70,71], this needs classification provides a suitable theoretical framework for our purpose. The criticism of a rigid hierarchy is negligible in our study since the focus is primarily on the classification of the needs. Moreover, Tay and Diener [72] show that the attainment of physiological and safety needs are usually aimed at first. Nevertheless, the attainment of other needs can be attained simultaneously, which suggests a partial hierarchy of needs. Furthermore, they found that the social circumstances of the country strongly influence the attainment of physiological and safety needs. In contrast, attainment of the other needs is mainly individually dependent. In the following subsections, we use Maslow's needs categorizations as a framework to investigate the associations with the consumption of other consumers' plate leftovers.

In addition to the factors directly associated with the consumption of other consumers' plate leftovers, a variety of contextual factors was mentioned that can shape the consumption of plate leftovers. For the main- and sub-themes addressing the context in which the consumption of other consumers' plate leftovers takes place, the three pillars of Scott's [73] institutional theory proved helpful in explaining the content relationships in more depth. Hence, "institutions comprise regulative, normative, and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life" [73] (p. 56). In other words, institutions can enable or limit behavior. Scott [73] distinguishes several carriers within these pillars or systems, one of which is the "artifact," or an object with precise specifications depending on its system affiliation. In the regulative system, these are "objects complying with mandated specifications"; in the normative system, these are "objects meeting conventions, standards"; and in the cultural-cognitive system, these are "objects possessing symbolic value" [73] (p. 96). Considering other consumers' plate leftovers as objects with different specifications depending on the corresponding system allows for an exemplary system-specific analysis of these plate leftovers.

We, therefore, deductively embedded our findings within the theoretical framework of Maslow's extended Hierarchy of Needs [66–69] and Scott's [73] institutional theory.

In order to summarize our findings, in the sixth step of producing the report [63] we developed a structured and overall picture of the themes by generating thematic maps (i.e., "an overall conceptualization of the data patterns, and relationships between them" [63] (p. 89)) and integrated them into an overall model of the consumption of other consumers' plate leftovers.

We analyzed the comments in German, as this is the original language of the comments and the authors' native language. A translator, who grew up bilingual and whose native languages are German and English, translated the comments for this paper.

3. Results and Discussion

Overall, our data show that attitudes toward the consumption of other consumers' plate leftovers are diverse. Some participants have an overall positive attitude, although

most of them emphasized that eating other consumers' plate leftovers is not conceivable for them: *"I wouldn't imitate it, but if it makes people handle their food more consciously and only take or order what they eat, then that's a good thing"* (960). Others have a relatively neutral attitude and view food leftover consumption more from an analytical perspective, which is reflected in the discussion of trade-offs between advantages and disadvantages: *"difficult . . . on the one hand a great idea, but the health concerns must be taken into account . . ."* (269). Whereas, still others have a negative attitude toward the consumption of other consumers' plate leftovers, and some of them even despise this consumption in principle: *"unbelievable: this is how far the Germans' world-saving madness against any kind of waste has come. I had a hard time suppressing nausea while reading the article"* (810). As a result, almost every aspect of the discussion about factors associated with the consumption of other consumers' plate leftovers is debated contradictorily. We have highlighted conflicting views in the following discussion at those points where, in our view, they help to understand conflicting associations better. Otherwise, we refer to associated factors of the consumption of other consumers' plate leftovers without explaining every counterposition in detail.

Furthermore, we found that consumers' associations with the consumption of other consumers' plate leftovers are depended on whether the behavior is perceived in the context of individual consumption or collective consumption. *"It is also a difference whether things are done by (possibly many) individuals, and inconspicuously, subliminally, which is usually not a problem, or collectively, and deliberately conspicuously, because still connected with a political message"* (760). In this regard, we also differentiate between understanding leftover consumption as individual consumer behavior or collective behavior within the consumer movement. By individual consumption or the individual consumer perspective, we understand such food decisions that consumers make in the perception that they are acting on their own, without others showing the behavior, or without the consumer thinking about whether others are showing the behavior. Whereas in the case of collective consumption or the collective consumer perspective, we assume food decisions that are made either in a consumer movement or with the perception that there are many other consumers engaged in the same behavior.

Figure 2 illustrates the main themes and sub-themes associated with the consumption of other consumers' plate leftovers embedded in a regulative, normative, and cultural-cognitive system. Thereby, it represents the main themes (represented by the oval boxes) and sub-themes (represented by the square boxes) we developed in our qualitative analysis, highlighting the connection with the needs categorization of Maslow [69], extended by the understanding of Koltko-Rivera [68] and Tay and Diener [72] as well as Scott's [73] institutional theory (represented by the pillars). The main themes and sub-themes, as well as interventions, will be discussed in more detail in the following sections.

3.1. Attaining Physiological Needs through Satisfying Hunger

Maslow [69] posited that physiological needs, such as hunger, thirst, and procreation, ensure the survival of human beings. As a basic need for survival, physiological needs, thus, concern maintaining one's bodily functions. This might explain why the consumption of other consumers' plate leftovers in satisfying hunger was discussed primarily from an individual consumer perspective.

Webb [74], who transfers Maslow's Hierarchy of Needs to food selection, assumes that in situations of greatest hunger, consumers break taboos regarding food selection to satisfy basic physiological needs. Consuming other consumers' plate leftovers can be seen as such a breach of taboo in the cultural and normative understanding of how to deal with plate leftovers. *"That's what my cat does, but it's unworthy of a cultured human being and just plain disgusting and unhygienic to boot—unless there's a famine going on among the students right now. However, nothing of this is known to me"* (810). This comment illustrates that the attitude towards the consumption of other consumers' plate leftovers is closely linked to the life situation of the consumer that eats the plate leftovers. Some respondents describe the consumption of other consumers' plate leftovers without a valid reason as

inappropriate; however, the experience of a precarious life situation can legitimize it. As 717 noted, “Everyone is free to eat leftovers if they want, maybe even must, because he or she is short of cash”.

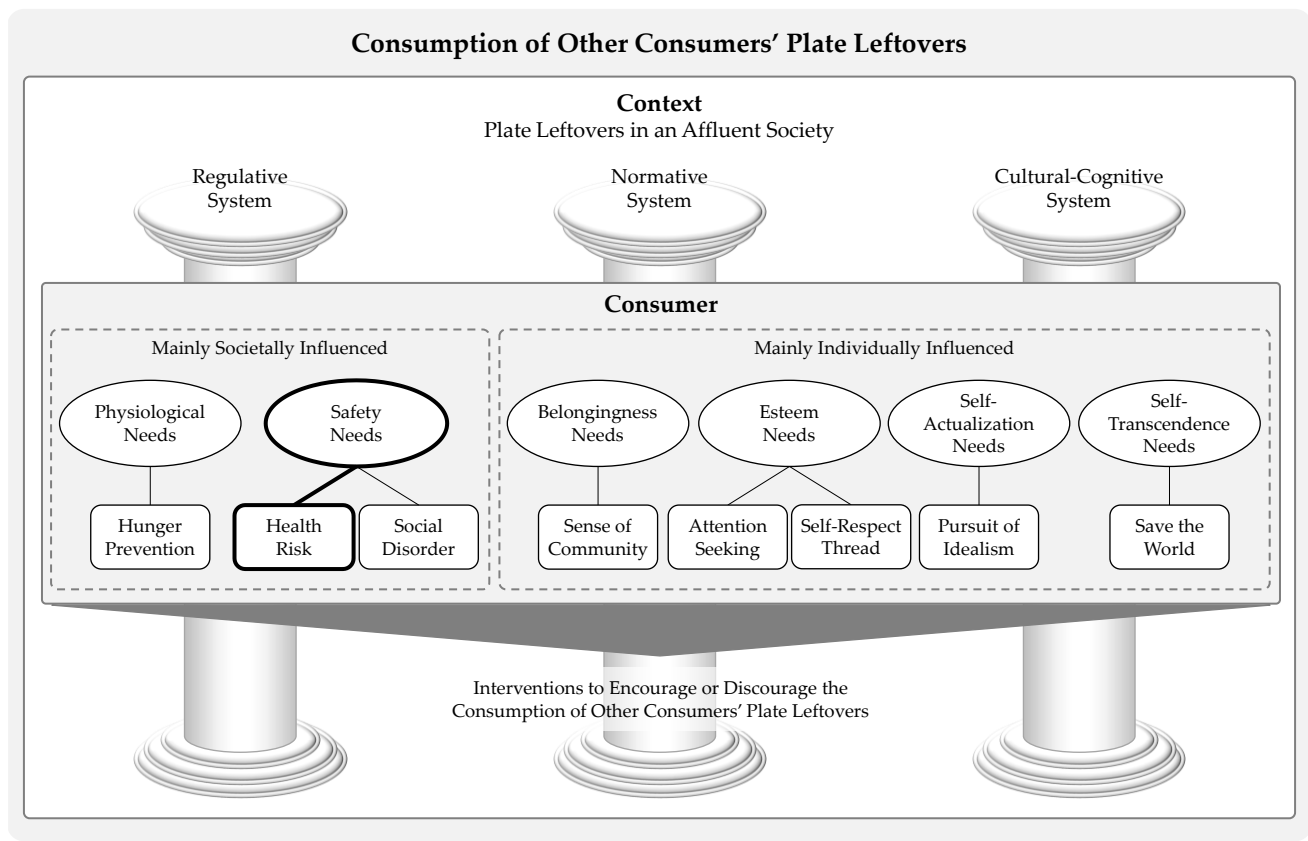


Figure 2. Main and sub-themes associated with the consumption of other consumers' plate leftovers, taking into account the contextual background.

Furthermore, satisfying the physiological need of hunger competes for cash with other needs to secure the basis of existence (e.g., housing). Thus, the free access to food through the consumption of plate leftovers can ensure the attainment of other basic needs. The legitimization is not limited to a current emergency situation (e.g., not enough money to buy food), but to a certain degree, also includes past traumatic experiences (e.g., war, postwar shortages). The definition of an emergency situation and, thus, the legitimization of consuming other consumers' plate leftovers can also depend on the perception of the consumer's sociodemographic status and the country's social structure. Accordingly, 932 noted, “in our society there is absolutely no reason to eat leftovers if you can afford it”. Furthermore, “in Germany, no one has to be poor. There you get enough from the state if you are penniless” (891). Further, some commentators point out that a consumer who eats other consumers' plate leftovers without being in an emergency situation poses a threat to the satisfaction of the physiological needs of those who do suffer from hunger. The legitimization of the consumption of other consumers' plate leftovers only for consumers suffering from hunger follows a pro-sociality logic of sharing food. The pro-sociality logic implies that leftover food should be given to poor people that in the eyes of the consumer really need the food [75]. Moreover, it highlights the underlying symbolic value of plate leftovers embedded in the commentators' cultural-cognitive system: plate leftovers are considered an edible food source, but only in food shortage situations.

3.2. Attaining Safety Needs through the Protection of Individual Health and Social Order

Safety needs that motivate behavior include “security; stability; dependency; protection; freedom from fear, from anxiety and chaos; need for structure, order, law, limits; strength in the protector; and so on” [69] (p. 39). We identified two overarching safety themes associated with the consumption of other consumers’ plate leftovers: the perceived health impact of the consumption of other consumers’ plate leftovers and the perceived impact of the consumption of other consumers’ plate leftovers on social order.

Here, the perceived health impact associated with the consumption of other consumers’ plate leftovers was the most discussed topic in the comments. The reason for focusing on this topic might be grounded in an understanding of food safety standards in developed countries such as Germany. Physiological and safety needs are considered as strongly societally influenced, whereas the other needs are mainly individually influenced [72]. In developed countries such as Germany, food availability, food security, and public health are at a high level [19,76]. Even if the consumption of other consumers’ plate leftovers occurs collectively, for most consumers, it does not threaten their fulfillment of hunger needs because the consumption of plate leftovers would not compete with the consumption of fresh food. While the supply of fresh food would not be affected by the consumption of plate leftovers, the consumption of other consumers’ plate leftovers may be perceived as a threat to society if it causes diseases to spread more rapidly. The fulfillment of safety needs is not only deeply rooted in the regulative, normative, and cultural-cognitive system of Germany but may also be taken for granted to a certain extent, as 859 stated: “*food hygiene has a high priority in Germany. For this, food is also thrown away, which is the price you have to pay for hygiene*”. Therefore, behavior that challenges those safety needs can be perceived as a severe threat to the consumer.

Perceived health risk through the consumption of other consumers’ plate leftovers was mainly associated with the perceived physical contamination of these leftovers through the previous eater. Physical contamination is based on contact between a contamination source and the recipient of the contaminated object, directly or indirectly via a medium [77]. Based on the discussion on the consumption of other consumers’ plate leftovers, two types of physical contamination can be differentiated: natural contamination, in which germs and bacteria are passed on through the food from the previous eater to the next eater, and deliberate contamination, in which intentional contamination of the plate leftovers affects the next eater.

Commentators connect deliberate contamination with the addition of substances such as “*ipecacuanha or phenolphthalein*” (184) or objects such as “*chewing gums*” (125), “*napkin[s]*” (180), “*fine [...] metal shavings or the smallest [...] glass fragments*” (184). There was no evidence in our data that the commentators were contaminating plate leftovers themselves in this way. They were merely discussing the idea that something like this could be done. A feeling of psychological ownership might explain the inducement of deliberately contaminating plate leftovers. Psychological ownership goes beyond legal ownership and emerges as an affective component in articulating property claims [78]. We see these claims of ownership when the commentators talk about “*their*” plate leftovers. Furthermore, psychological ownership can go beyond the state of disposal; even after disposal, some commentators want to decide who gets the plate leftovers or what happens to them. By modifying plate leftovers, the previous eater can teach the one taking his or her plate leftovers a lesson or directly prevent someone else from finishing his or her leftovers: “*On my food scraps I can dump a little ipecac or phenolphthalein, after all, it should be disposed of*” (184). While changing the appearance of plate leftovers (e.g., through mixing or adding napkins) makes contamination of the previous eater directly visible, the previous comment, however, shows that deliberate contamination might not always be identifiable for a potential eater of these plate leftovers. Whereas visible deliberate contamination can trigger a sense of disgust in the potential eater and thus prevent consumption, invisible deliberate contamination would represent a direct health risk since the substance or object would be consumed without notice.

In contrast to deliberate contamination, which commentators associated with a negative impact on health, natural contamination of plate leftovers is either associated with a negative health impact (i.e., spread and transmission of diseases) or a positive health impact (i.e., long-term strengthening of the immune system): *“The repeatedly nibbled on food by different people is the best way to catch any disease”* (739), in contrast to *“A little dirt keeps you healthy. The human immune system needs viruses, bacteria and parasites. This protects against allergies and cancer”*. (3).

Argo et al. [79] show that a product another consumer has touched can prompt negative reactions such as decreased purchase intentions. Furthermore, they show that the emotion disgust can mediate this negative relation. Disgust describes the fear of being soiled, which can intensify with physical proximity to a disgusting object (e.g., contact with bodily secretions) [80]. In the case of the consumption of other consumers' plate leftovers, this could be the fear of being soiled by strangers' saliva. The feeling of disgust in connection with the consumption of other consumers' plate leftovers was also mentioned repeatedly in the comments with expressions such as *“gross!”*, *“eeeew,”* and *“ugh!”* (e.g., 157; 232; 134). Others noted physical consequences associated with the feeling of disgust, such as instant *“nausea”* (526). Some commentators react very emotionally to the consumption of other consumers' plate leftovers, while others cannot understand the intensity of perceived disgust. This difference in perception can be explained by a consumer-specific disgust sensitivity [81]. Individual disgust sensitivity can also influence the amount of food wasted; consumers with higher food disgust sensitivity tend to waste more food than consumers with lower food disgust sensitivity [82].

Here, commentators also point out that consumers cannot know for sure what happened between the time the canteen handed out the fresh food and the plate leftovers were passed on. This period represents a black box that forces the consumer to make assumptions about what might have happened in the time in between. These assumptions can have a fundamental influence on how the impact on health is perceived.

For example, Morales et al. [83] assume that there has to be a contamination cue that triggers perceptions of contact. In our case, the plate leftovers' appearance might be such a cue. It can trigger the awareness that another consumer has already started eating the meal. Our data show that the willingness to eat other consumers' plate leftovers is associated with the appearance of these leftovers: *“presumably the Bänderer will also select and not touch disgusting looking leftovers from unappealing looking people”* (554). This can be compared to studies that have shown that liking of a meal increases when the meal is presented attractively and neatly [84,85].

The previous eater might be another clue that can influence the perceived level of contamination of plate leftovers. Argo et al. [86] show that the negative contamination effect can be reversed by the touch of a highly attractive person of the opposite gender. Some commentators refer to this aspect and state that the appearance of the previous eater can influence the willingness to eat their plate leftovers. In this context, however, commentators mainly argue that a certain appearance would hinder the consumption of other consumers' plate leftovers rather than encourage it. Therefore, the previous eater's appearance might be used as a heuristic to decide whether plate leftovers are acceptable for consumption or not: *“the visual appearance of some students alone would prevent me from consuming food sneezed or nibbled on by them”* (813).

While we did not find any evidence of a reversal effect of the previous eaters' appearance in the comments, our data show that for some commentators, the willingness to eat other consumers' plate leftovers can increase with stronger relationship proximity. These commentators pointed out that many people would share plate leftovers within their family without hesitation, but few would share plate leftovers with unknown others. This discussion provides insights into the understanding of perceived relationship proximity as an influencing factor in plate leftovers' acceptability for consumption. There seems to be a continuum of relationship proximity for the acceptability of plate leftovers: while some commentators refused to eat plate leftovers at all, some would only eat plate leftovers

from their closest companions, such as their partner or family. In contrast, others perceive the consumption of plate leftovers from friends, acquaintances, or work colleagues as acceptable. Only a few stated that they could imagine eating the plate leftovers of unknown others. This is in line with Miller et al.'s [53] findings that sharing food is associated with personal bonding and intimacy. Furthermore, Lazell [51] suspects that social bonds guarantee trust in food safety. This assumption is also reflected in our data. The closer a relationship, the more someone might feel capable of assessing the state of health of this person, as this conversation indicates: *"occasionally, I also taste from my wife's plate in restaurants (and vice versa). In your opinion, is this also a disregard for the simplest rules of hygiene?"* (947). *"No. Because you (should) know the exact state of health of your wife. You will not eat from one plate with her if she has a contagious disease right now"* (862). In contrast, the health assessment of an unknown previous eater is difficult or impossible.

In assessing the health risk of eating other consumers' plate leftovers, some commentators made analogies to other situations, noting that consuming other consumers' plate leftovers does not represent as great a health threat as, for example, public places, public transport, public restrooms, or the exchange of physicality such as touching, kissing, or sex: *"if the 'predecessor' next to you in the cafeteria, in the lecture, on the bus . . . sneezes you will also get the viruses. If you touch the door handle the person with the virus touched before, you will get the viruses. If you kiss your boy/girlfriend . . . You can think what you want about Bändern, but your panic about diseases is not rationally justified"* (387), or *"I think kissing and sex would be more questionable. And a student would hardly let that stop him/herself either"*. (887).

Other commentators compared the consumption of other consumers' plate leftovers with the consumption of food items from dumpster diving. These commentators noted that food consumed by dumpster divers is typically packaged and, therefore, protected from prior contact with another consumer. In contrast, plate leftovers have had direct contact with another consumer, which makes it, from a health protection point of view, even more problematic for them: *"from a hygiene point of view I regard dumpster diving much more harmless than to eat food that someone before me has already worked on, perhaps spit on, unintentionally or intentionally, because he does not like the people by the conveyor belts"* (69). This perception of an increased health risk for plate leftover consumption compared to dumpster diving might be attributed to the reduced physical proximity between the contamination source and the contaminated object. Argo et al. [79] assume that physical proximity might be exceptionally high for food items. Surplus food rescued through dumpster diving and plate leftovers rescued through Bändern differ by the barrier represented by the presence or absence of packaging. The absence of packaging can intensify the perceived physical proximity between the previous eater as a source of contamination and their plate leftovers as an object of contamination. It, thus, can lead to a decrease in the willingness to consume these plate leftovers compared to, for example, dumpster diving for food. Physical proximity regarding the consumption of other consumers' plate leftovers can also be influenced by the type of food and associated eating behaviors. Some commentators differentiate between eating with cutlery and eating with fingers, noting that both forms are sources of contamination but with different perceived contamination potential. For example, *"meat that has been cut cleanly with a knife, untouched side dishes in extra bowls"* is perceived as less contaminated than *"potato salad or mashed potatoes, half of which has already been eaten"* (120).

Again, commentators held conflicting opinions on the health risk of contamination when comparing eating with cutlery or with hands, as the following conversation shows: *"the illness may have occurred a few days ago, that is easily enough for further spreading. Not everyone washes their hands"* (872). *"The greatest risk is actually in the food that is eaten by hand. A bit on pretzel is much more risky than, for example, meat with gravy, potatoes and vegetables"* (947). *"No, do you take a new piece of cutlery for every bite? The 10 viruses that wander from the used fork/spoon/knife back into the food are enough"* (872). This conversation also shows that the impact of physical proximity on perceived physical contamination can be influenced by the presumed hygiene practice of the previous eater.

Figure 3 summarizes the health-related findings and provides a conceptual model of the health-related interactions associated with the consumption of other consumers' plate leftovers. This conceptual model aims to present the variety of the codes related with the health risk of the consumption of other consumers' plate leftovers in a structured way. It is based on the interpretation of comments, taking into account existing theories and models, as discussed above. However, in the absence of a quantitative analysis of the comments, no conclusion can be drawn about the relative importance of the different codes. This can be the goal of a future quantitative survey, for which this conceptual model can serve as a basis.

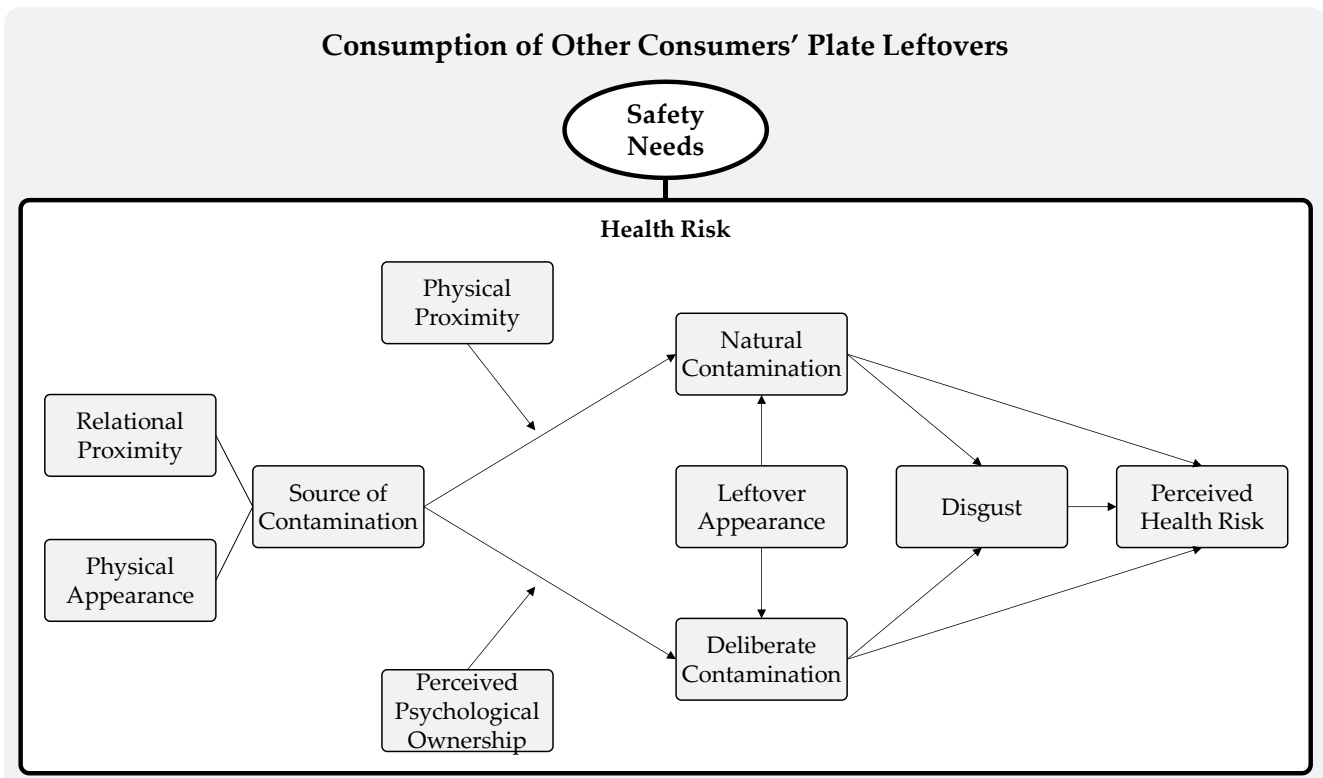


Figure 3. Conceptual model of the health-related interactions associated with the consumption of other consumers' plate leftovers.

The commentators' discussion about health risks associated with the consumption of other consumers' plate leftovers also determines the discussion about the security of social order. Here, commentators referred to the possible economic damage caused by costs for the health care system if consumers fall ill from the consumption of other consumers' plate leftovers. In addition, they also mentioned private-sector damage to the canteen—for example, lost income or possible claims for damages if a consumer falls ill as a result of eating other consumers' plate leftovers in the canteen. This private-sector damage is further linked to economic damage by the commentators, pointing out that German university canteens are subsidized by the state.

In addition to a financial threat to society, commentators commonly mentioned the threat to the normative and cultural-cognitive system by the consumption of other consumers' plate leftovers. Some considered the consumption of other consumers' plate leftovers as breaking a social taboo: *“it is an absolute ‘NOGO’ to eat from the plates of totally unknown strangers”* (89). Such behavior is associated with disgust or shame and is declared as not worthy for a human being: *“for me personally this is not about germs (they may be meaningless), but about a psychological component that has something to do with food culture, disgust threshold, sense of shame, dignity and self-respect”* (810).

This comment points out the differentiation of food into edible and non-edible [74]. Here, a regulative understanding of food waste could shape consumers' understanding of non-edible food items. After returning plate leftovers to the food service organization, plate leftovers are classified in a regulatory sense as food waste and must, therefore, be disposed of professionally. This understanding can implicitly influence consumers' understanding of plate leftovers, considering they will return their plate leftovers to the canteen after finishing their meal.

Furthermore, from a normative and cultural-cognitive point of view, once the food is classified as waste it cannot simply be recovered in a socially acceptable way [51]. This, in turn, might be manifested in the disgust that some commentators feel when they think about eating the plate leftovers of others. Here, the feeling of disgust does not refer to pathogenic disgust, as with the fear of possible disease transmission and, thus, physical contamination. Instead, it can be interpreted as moral disgust [87], triggered by the threat to the social norm of nutritional etiquette. As was already apparent in the comments on the satisfying of hunger, for many the consumption of other consumers' plate leftovers is legitimate only in an emergency. Otherwise, the consumption of other consumers' plate leftovers can be accompanied by a feeling of social disadvantage: *"there have always been and will always be these rule-breaking marginalized groups, who, because others adhere to rules for an orderly coexistence, can lead an unscathed freeloading life"* (336). According to Rozin et al. [87], moral disgust is caused by moral offenses and can serve to protect the social order. The threat to the social order is particularly mentioned when the consumption of other consumers' plate leftovers is perceived as a collective consumer behavior. Comments indicate that the reason for this might be that the behavior is carried out by consumers not only collectively but also deliberately to criticize the existing social system.

In addition, the prevalence of behavior appears to be a key component in the perception of threats to social order. Commentators noted that the behavior could be tolerated as long as only a few people show the behavior. Whereas some commentators perceive the Bänderer as a *"cranky minority"* (321), still others perceive the behavior as disruptive because of its prevalence: *"if someone asked me, if they could have it—I'd love to, maybe if I had left more I would even ask if they wanted it. But not if there are 40 people hanging around and lunging at every tray"* (412). A possible reason for the different perception of the phenomenon might be the understanding of the associated context: compared with the local, regional, national or international population, 40 consumers constitutes only a marginal group. However, if these 40 consumers eat other consumers' plate leftovers in a canteen, this might no longer seem to be a minority compared to the comparatively small number of canteen visitors and could, therefore, be perceived as a threat to the social order. Furthermore, many consumers who act individually (i.e., not collectively in a consumer movement) are perceived as less problematic than many consumers who jointly take action against an existing social order.

Finally, some commentators make a clear distinction between what they perceived as behavior acceptable in the private sphere but not in the public sphere. *"Maybe students, as future elite, should simply learn that in public spaces other customs apply than among friends or at home"* (760).

3.3. Attaining Belongingness Needs through a Sense of Community

Love and belongingness needs refer to the need for interpersonal relationships, which includes being part of a community [69]. A threat to this need exists when someone feels excluded or rejected [69]. The consumption of other consumers' plate leftovers can be either a vehicle to attain belongingness needs or a threat to them. The difference harks back to the consumption of plate leftovers as collective behavior in a consumer movement or as individual consumer behavior. Consumers who are part of the Bänderer movement experience a sense of community, which can help them to attain their belongingness needs; at the same time, the sense of community experienced by the Bänderer can threaten the attainment of belongingness needs of those who are not part of this movement: *"the community among the Bänderer is also special. You don't sit in isolation when eating, it's like a*

big family. If there is something good, like fries, and you see that someone else wanted to get it too, you give them some. I've made a lot of new friends here" (news media article 5). *"So you make the world a little bit better, in community of course, while the others are all sitting there isolated (no community at all)"* (392). This differentiation reflects the social identity approach of in-groups and out-groups, or inclusion and exclusion [88,89]. Those consumers who consume other consumers' plate leftovers represent the in-group; they form the community. By consuming other consumers' plate leftovers, this community acts collectively and according to its standards and values. Consumers that do not belong to this group are isolated. Therefore, the consumption of plate leftovers can be a symbolic act that determines whether a person belongs to the in-group or not. Furthermore, Kniazeva and Venkatesh [90] (pp. 423–424) attribute a "bonding power" to meals. Plate leftovers can have this kind of bonding power for the movement. Maslow [69] concludes that the need for belonging and community in the face of a perceived common threat from outside ties young rebel groups together and motivates them to act together. The goal of reducing food waste, fostering a change in the existing food system and the joint consumption of plate leftovers, can contribute to this sense of community. The Facebook group "Die Bänderia" enables and exemplifies such cohesiveness by facilitating an exchange between those fighting against food waste and the system that encourages this food waste.

Nevertheless, this sense of community for the Bänderer can lead to the experience of exclusion among other consumers. Compared to the sense of community in the consumer movement, we observed feelings of exclusion in the comments for consumers who would consider themselves part of the out-group. Assuming a partial hierarchy of needs proposed by Tay and Diener [72], this feeling of exclusion might be intensified by a dilemma of conflicting needs between the attainment of safety needs and belongingness needs. For example, some commentators stated that the feeling of disgust when thinking about eating other consumers' plate leftovers makes them unable to do so, as stated by 526: *"I could not do it, I immediately feel nauseous with such things"*. This can be linked to the protection of safety needs. In contrast, refusing to eat other consumers' plate leftovers could lead to a feeling of rejection from the consumer movement, which, in turn, can cause a threat to the belongingness needs.

When focusing on the consumption of other consumers' plate leftovers from an individual consumer perspective, the bonding power of plate leftovers is not observable. Here, we found a reverse understanding of the in- and out-group. The individual consumer who decides to consume other consumers' plate leftovers perceives himself as being in the minority. Therefore, the consumption of other consumers' plate leftovers rather threatens the belongingness needs. The normative perspective that this kind of food decision represents an unacceptable behavior from the public's point of view shapes a feeling of shame when consuming other consumers' plate leftovers: *"I have already done that at the end of the 80s in our large university canteen. It always took some effort because it was embarrassing and all, but it always tasted great. It was best when people left it at the table. At the conveyor belt it was always a bit embarrassing, but if worth it . . . fun time"* (234). The differentiated picture of the social effect of plate leftover consumption, depending on the perception as collective or individual consumption behavior, could further explain the restrained motivation to share food observed by Lazell [51].

3.4. Attaining Esteem Needs through Gaining Attention and Protecting Self-Respect

For the esteem needs, Maslow [69] differentiates between the need for receiving appreciation and attention from another person and the need for self-appreciation. Eating other consumers' plate leftovers can bolster and threaten esteem needs, depending on the perspective on the consumption of other consumers' plate leftovers as an individual or collective food decision.

According to Webb [74], the desire for attention and respect can be displayed in choosing high-cost and prestigious food items that express wealth and success. Plate leftovers might represent the opposite. Some consumers expressed that they would feel

stingy and impoverished if they would have to eat plate leftovers that other consumers no longer wanted. They further associate this with a negative impact on self-esteem and pride: *“for me, it would be beneath me to eat something that a stranger disdained. In addition, as a generous person, I would feel extremely stingy and would have the feeling that I could not afford my own food, which in turn has something to do with self-esteem and pride”* (810).

Thus, eating other consumers' plate leftovers can negatively influence the achievement of esteem needs and would, therefore, be avoided. Nevertheless, considering the consumption of other consumers' plate leftovers as a symbolic act in a consumer movement, leftover consumption could become a vehicle to demonstrate one's values. Considering the consumption of other consumers' plate leftovers as socially unacceptable, consuming these leftovers might lead to even greater attention than the consumption of more accepted food items such as the food saved from dumpster diving. Here, the consumption of plate leftovers could help to attain attention. Furthermore, respect can be received from other consumers in the movement or from sympathizers outside the group. A threat to esteem needs might arise if someone feels not respected enough, for example, within the consumer movement. Here, the individual behavior and the individual is lost in the group behavior, which in turn can threaten self-esteem needs. Therefore, additional ways of gaining attention can emerge: *“that it is all about self-promotion became clear yesterday when the people from the television station were here. Suddenly there were 10 Bänderer standing at the conveyor belt in front of the cameras. Normally there is max. 1 person standing there. But when one of them climbed on a table and shouted through the cafeteria that we shouldn't forget that he was the first to start doing it, I didn't believe anything anymore. I guess it's not about 'saving' food, but about the attitude towards life”* (149).

While commentators discussed respect shown by others for the consumption of other consumers' plate leftovers contrarily, the self-respect through the consumption of other consumers' plate leftovers is mainly perceived as threatened.

3.5. Attaining Self-Actualization Needs through Idealism and Self-Transcendence Needs through Reducing Food Waste

Self-actualization needs refer to the development of one's best self [69]. Finally, at the level of self-transcendence needs, the fulfillment is motivated by a higher purpose [68].

Concerning self-actualization and self-transcendence needs, the comments on the factors and threats associated with the consumption of other consumers' plate leftovers become blurred. Therefore, we carry out the discussion of the two needs together.

For both stages, the underlying goal of contributing to a sustainable development by reducing food waste through the consumption of other consumers' plate leftovers can be emphasized. For self-actualization needs, reducing food waste by eating other consumers' plate leftovers is associated with strengthening one's idealism. Thus, it is directed toward one's development into a sustainable self and can be defined by one's sustainable actions and being. For self-transcendence needs, reducing food waste through the consumption of other consumers' plate leftovers is associated with the higher purpose of reducing the social and environmental consequences of food waste to save the world. In this context, positive comments underline the quest associated with fulfilling self-transcendence needs, whereas negative comments question this quest for a higher purpose. Here, it seems irrelevant whether the behavior is perceived collectively or individually.

In the argumentation for attaining self-transcendence needs by the consumption of other consumers' plate leftovers, it becomes apparent that it is not only a matter of reducing plate leftovers in the canteen but also of understanding the problem of food wastage from a holistic point of view. Indeed, some commentators explicitly reference the dissolution of egocentrism and the achievement of a higher purpose with the consumption of other consumers' plate leftovers: *“what a meta-egomania you're getting lost in here. It's not about rebellion and pallid stories in old age. It is about food waste, while others have to starve, animals die unnecessarily. This happens in the NOW and is completely independent of age and especially of ego”* (451).

A further indication for achieving a higher purpose represents the consumption of meat-containing plate leftovers by vegetarians, who act against their idealistic goals and eat other consumers' plate leftovers even when they contain animal-based ingredients. According to them, it is more important to avoid waste and thus the unnecessary death of an animal than to stick to the principles of a vegetarian diet (e.g., new media article 7; 645).

Some commentators also highlight that the consumption of other consumers' plate leftovers can not only enable an immediate reduction of the amount of food waste, but it can also create awareness of the problem of food wastage. This, in turn, might lead to a long-term change in other consumers' consumption and disposal behavior. Nevertheless, not all commentators were convinced that consumption of other consumers' plate leftovers can lead to a sustainable behavioral change. Furthermore, they did not see any benefit for society from the consumption of other consumers' plate leftovers: *"what's interesting [. . .] is that the students sell the Bänder in a way as a social act, as a reference to food waste. This raises the question for me: What is actually bad about the waste? It doesn't hurt anyone for now. Conversely, however, it serves no one by eating the leftovers except their own wallets. If they collected the money they saved and donated it, it would be a completely different matter. This way it seems dishonest and stingy to me"* (936).

The divergence of opinions on the extent to which the consumption of other consumers' plate leftovers represents an altruistic food decision in favor of a higher purpose is apparent in the emotionality of the discussion. Moreover, as the last comment demonstrates, for some consumers, the fulfillment of self-actualization needs is instead perceived as an excuse to justify the fulfillment of lower personal needs at the expense of others: those who eat other consumers' plate leftovers benefit in that they do not have to pay for it. Furthermore, some commentators argued that it is rather about humiliating those who leave the plate leftovers by demonstrating to them their apparent misconduct: *"nonsense. With it (save the world! Stop waste!) these 'Bänderer' justify their behavior, in order to not have to admit that they are freeloaders. And they admit it, too: ' . . . I could afford it, but . . . ' And then they are also still insulted as 'squanderers', who make it possible for the 'Bänderer' to eat for free"* (328).

Those commentators who are more open-minded towards the consumption of other consumers' plate leftovers associate the behavior more likely with attaining self-transcendence needs. Whereas those who are more critical about the behavior question these higher goals and suspect self-fulfilling goals behind the behavior. In so doing, they deny the satisfaction of transcendence needs and contextualize the behavior on lower need levels, such as improving one's idealism for attaining self-actualization or gaining attention to fulfill self-esteem needs.

3.6. Implications Based on the Associations with the Consumption of Other Consumers' Plate Leftovers

Although a qualitative study is not able to generalize results, the online discussions give the first impression that the number of consumers who can imagine eating other consumers' plate leftovers, especially in the public space, seems to be very small. This raises the question of whether such a consumer intervention is relevant to effectively reducing food waste. From our point of view, there is no clear answer to this question.

What the movement has achieved with its intervening food decisions is to draw attention to the issue of food waste, at a point where food disposal has a particular social, environmental, and economic relevance. Although awareness can be considered a prerequisite for behavior change, it does not necessarily lead to behavior change [91]. Our study highlighted various factors associated with the consumption of other consumers' plate leftovers that may serve as barriers to changing behavior towards the consumption of other consumers' plate leftovers. Furthermore, awareness itself can be a barrier. Studies show that consumers are often unaware of the amount of food they are discarding. They assume that they are wasting nothing, or far less food than they actually do [92], and less than other consumers [93]. Therefore, the awareness of discarding plate leftovers, even though they are still edible—a behavior that one does not ascribe to oneself—can lead to cognitive dissonance. Cognitive dissonance is a perceived state of tension that can arise, for example,

from diverging attitudes and actions [94]. For the consumption of other consumers' plate leftovers, someone has to leave food on their plate. The fact that someone else continues to eat these leftovers can make the previous eater aware that they have wasted edible food. Furthermore, holding an attitude towards food waste as an avoidable behavior would demonstrate the discrepancy between their attitude and their wasteful behavior. To resolve this state of cognitive dissonance, consumers use various strategies, including adapting their own opinions to their behavior to resolve the state of cognitive dissonance [95]. One option for consumers in this situation would be to negate the problem of food wastage and reinterpret it. This negation of the problem is also reflected in some comments noting that reducing one's own food waste would not effectively combat poverty in other countries. The plate leftovers are also paid for, which in the eyes of the commentators legitimizes the consumer's decision to waste the food. "Pft. What do you mean, sin? Seriously? Besides, it's all paid for. I don't feel bad about that. P.s. Do you send your leftovers to Africa to the starving children?" (328). Furthermore, commentators pointed out that the plate leftovers are not wasted but rather recycled, for example, in industrial processing: "'uneaten food will otherwise end up in the trash.' Wrong – leftover food from canteens, cafeterias, etc. ends up as raw material in biogas plants and not in the trash" (389). This demonstrates that drawing attention to the problem of food wastage does not automatically lead to a favored behavior change. Instead, it may trigger other reactions that run counter to the intention of reducing food wastage.

A first impulse could, therefore, be to hamstring the consumption of other consumers' plate leftovers. The Studierendenwerk Freiburg Schwarzwald did this by installing covers over the tray return belt so that the Bänderer no longer had access to the plate leftovers. However, such an approach, which may seem understandable from a legal perspective, as 872 pointed out, "*the responsible parties cannot react in any other way, they are obliged to implement the HACCP concept according to EC 852/2004. Whether you think this is good or not is irrelevant*", does not address the fundamental problem of the disposing of edible food denounced by the Bänderer. A more reasonable approach from a sustainability perspective would be to prevent plate leftovers in the first place. For this, interventions need to be implemented that aim to address the reasons that are responsible for the occurrence of plate leftovers. Various preventive interventions were proposed in the online discussions: adjusting portion size (i.e., selection of different portion sizes, e.g., 759; smaller portions but free seconds, e.g., 121; freely selectable quantities, e.g., 412), changing the choice architecture (i.e., letting people choose the composition of dishes themselves, e.g., 840; buffet instead of service lines, e.g., 1034), incentives for plate leftover reduction through a targeted pricing policy (e.g., offering smaller portions relatively cheaper than larger portions, 159; paying by weight, especially in buffet forms, e.g., 101), improving food quality (i.e., improving the taste experience, e.g., 554; improving food appearance, e.g., 645; offering more fresh dishes instead of convenience food, e.g., 413), and analyzing the discarded plate leftovers (i.e., type and quantity of different components, and exploring the reasons for disposal through interaction with consumers, e.g., 1070). These interventions address various reasons for the occurrence of plate leftovers in canteens discussed in the literature (e.g., portion size [11–13,96]; food quality [12–14]).

Although food wastage prevention is, in principle, the preferred approach when addressing food wastage reduction [36], it is unlikely to prevent all food from being lost or wasted. This, in turn, places the consumer movement of the Bänderer back in focus. The point here is not to consider the consumption of other consumers' plate leftovers as an intervention, but rather to use this kind of food decision as inspiration for interventions. At its core, the consumption of plate leftovers is about the reuse of edible food leftovers. Reuse of food resources for human consumption represents the preferable intervention after prevention [36]. This hierarchy is based on the fundamental idea that food resources should be preserved for human consumption for as long as possible [41]. Thus, from a sustainable development perspective, reuse of food leftovers is preferred over recycling food leftovers in industrial processes [41]. Furthermore, this illustrates that, contrary to

the view of some commentators (e.g., 389), consuming plate leftovers instead of recycling them can make a difference. The reuse of plate leftovers can be addressed by food service organizations using multiple interventions. This includes, for example, offering different portion sizes or the possibility of a second helping [96]. However, when an adjustment of portion size is not possible, consumers can be informed already at the food counter that sharing food is possible. For this purpose, additional empty plates and bowls can be provided. Here, consumers can be actively encouraged to share food considering certain hygiene rules (e.g., sharing food before the first bite, not touching the food with bare hands). Such an approach could reduce the (perceived) health risk associated with the consumption of shared food. However, the discussions about the normative and cultural-cognitive understanding of consuming plate leftovers in public space demonstrate that the effect of such an intervention might be, however, limited.

As an alternative to sharing meals, 784, for example, suggests offering doggy bags for plate leftovers, so consumers can take plate leftovers home for later consumption. Even though this is a viable option to avoid disposing of plate leftovers in canteens—also from a legal point of view—studies show that most consumers do not actively ask for doggy bags [13,97]. In a study by Miroso et al. [97], only 5.3% of respondents reported actively asking for doggy bags in restaurants. Studies show that there are several reasons for this [13,97–99]. Forty-two percent of respondents in a study by Giorgi [13] indicated that asking for a doggy bag is “embarrassing” to them. Furthermore, Hamerman et al. [99] found that when consumers are eating with someone they want to impress, they are less willing to take plate leftovers. Doggy bags can thus represent a dilemma for consumers: on the one hand, they want to reduce food waste; on the other hand, they find themselves in a situation where it would not be acceptable for them to ask for a doggy bag, for example, due to personal norms [98]. Sirieix et al. [98] point out that in order to solve this dilemma, it is necessary to make the takeaway of plate leftovers easy and to consider it as the normal or desired behavior. A possible solution could be that takeaway possibilities are actively offered by the food service organizations. Hamerman et al. [99] show that actively offering a doggy bag can increase the likelihood of taking leftovers. The legislation that came into force in France in 2016 takes up this idea to reduce food waste [100]. Accordingly, food service organizations, such as restaurants that serve more than 180 meals a day, have the obligation to offer doggy bags [101]. Another reason for restrained use may be the name doggy bag: consumers either cannot imagine anything under the term doggy bag or find this term repulsive [13]. Naming was also an issue during the launch in France, where the hotel and restaurant industry union UMIH developed the term “le Gourmet Bag” as an alternative [101]. From a sustainable development point of view, another argument against these doggy bags could be the additional resource expenditure in the form of packaging material. However, different studies show that the overall environmental impact of food wastage is mostly higher than the impact of packaging material [102,103]. With the right framing, therefore, takeaway options for plate leftovers can be a way to encourage the reuse of plate leftovers. In order to inform and remind consumers of takeaway options for plate leftovers in canteens, printed information on the canteen tray would be possible. Fogg [104,105] highlights that motivation, ability, and a prompt, triggering the behavior at the moment when the behavior should be exhibited, are necessary to initiate a behavior. The takeaway option for plate leftovers would allow consumers to take their plate leftovers, and the printed information on the tray would provide a reminder when the behavior change should be initiated. If there is sufficient motivation, the likelihood of plate leftovers being reused could be increased.

In addition to the regulative, normative, and cultural-cognitive contextual factors, our study showed that plate leftover consumption is associated with various motivational associations. Although we observed a tendency to decline the consumption of other consumers’ plate leftovers in public spaces, the nature of our data limits the generalization of this conclusion. Nevertheless, the aim of our paper was not to present the consumption of other consumers’ plate leftovers as an intervention but rather to use this intervention,

which emerged from a consumer movement, to develop a broad understanding of the consumption of other consumers' plate leftovers. Besides the generalizability of the results, the study bears other limitations.

First, although the discussions refer to actual behavior in the real world, the findings are based on comments made in the virtual world. Therefore, even though the different associations provide a coherent picture of the consumption of other consumers' plate leftovers, this aspect must be considered when interpreting the results. Furthermore, as already mentioned in the methods section, the data do not allow conclusions about the identity of the commentators. In that case, the study is also limited to Germany. However, due to the particular relevance of out-of-home consumption in China [8] and the different regulatory, normative, and cultural-cognitive systems, it would be interesting to investigate the consumption of other consumers' plate leftovers in a comparison between the countries.

Second, although the online discussions are confined to the out-of-home context, our findings on perceived health risks are reflected in studies investigating plate leftovers in the household (e.g., [54]). In order to draw conclusions about the effectiveness of the individual influencing factors, future research can quantitatively investigate these interactions in the out-of-home and household context. Figure 3, in particular, provides an initial conceptualization of the perceived health risks associated with plate leftover consumption.

Third, since the data collection took place before the COVID-19 pandemic, no conclusion can be made about how the consumption of other consumers' plate leftovers is viewed in times of pandemics such as COVID-19. However, some comments in our dataset indicate that the consumption of other consumers' plate leftovers can be associated with a great health risk through highly contagious viruses (e.g., *"as long as nothing happens it's all cool and alternative. But, let ten people get sick with a highly contagious virus"*, 1070). In times when hygiene issues are ubiquitous, such perceptions may become even more prominent. This, in turn, might create a dilemma for those for whom food waste reduction is an important issue and who, because of hygiene concerns, now feel less able to consume surplus food (whether in Bändern or by food sharing). Furthermore, a study by Burlea-Schiopoiu et al. [106] shows that COVID-19 can increase awareness of food waste, especially among students. By breaking down old behaviors, the need to reflect on one's behavior, and necessary behavioral changes (e.g., due to cafeteria closures), students became more aware of food wastage issues [106]. This awareness of food wastage could also lead to greater effectiveness of prevention and reuse interventions in the future. Studies show that awareness of and interest in food wastage reduction can be a key driver for food wastage prevention [107]. Therefore, the tension between health concerns and the reuse of surplus food or plate leftovers can offer an exciting starting point for future research. Integrating food wastage concerns into our conceptual model (see Figure 3) can provide an initial framework for this.

4. Conclusions

Considering the vast amount of food that is wasted worldwide, a change in perspective is needed. This also includes questioning the prevailing understanding of food wastage, especially plate leftovers. Are plate leftovers waste, or are they edible food items? In our study, we used the behavior of the consumption of other consumers' plate leftovers to gain insights into understanding plate leftovers in out-of-home settings such as canteens. The analysis of comments from online discussions demonstrates that the understanding of plate leftovers is embedded and shaped by the regulative, normative, and cultural-cognitive system. Furthermore, associations with the consumption of other consumers' plate leftovers are psychologically determined and associated with the satisfaction of universal needs. We observed a clear distinction between whether the consumption of plate leftovers is understood as part of a consumer movement or as an individual consumer behavior. In the context of a consumer movement, the consumption of other consumers' plate leftovers can play a particular role in achieving a sense of community and reducing food waste for idealistic or environmental and social reasons. Considered as an individual

consumer behavior, the consumption of other consumers' plate leftovers can satisfy hunger but can also represent a threat to health and social order.

Due to the complex relationships underlying the understanding, generation, and handling of food wastage, a multidimensional solution is necessary to determine the best way to reduce the vast amount of food wastage. Even though consumption of other consumers' plate leftovers might only constitute a marginal reduction of food waste directly or indirectly, the results of this study demonstrate that the difference between waste and edibility begins in the regulative, normative, and cultural-cognitive system and manifests in the mind and, as a result, in the behavior of consumers. Thus, interventions to reduce food wastage should start there. Furthermore, considering plate leftovers as a valuable resource beyond industrial processing not only opens up a new perspective for further research but also provides sensitization to the value of food.

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Data Availability Statement: The data that support the findings of this study may be available on request from the corresponding author, L.D. These data are not publicly available for reasons of anonymization.

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Appendix A. Sample

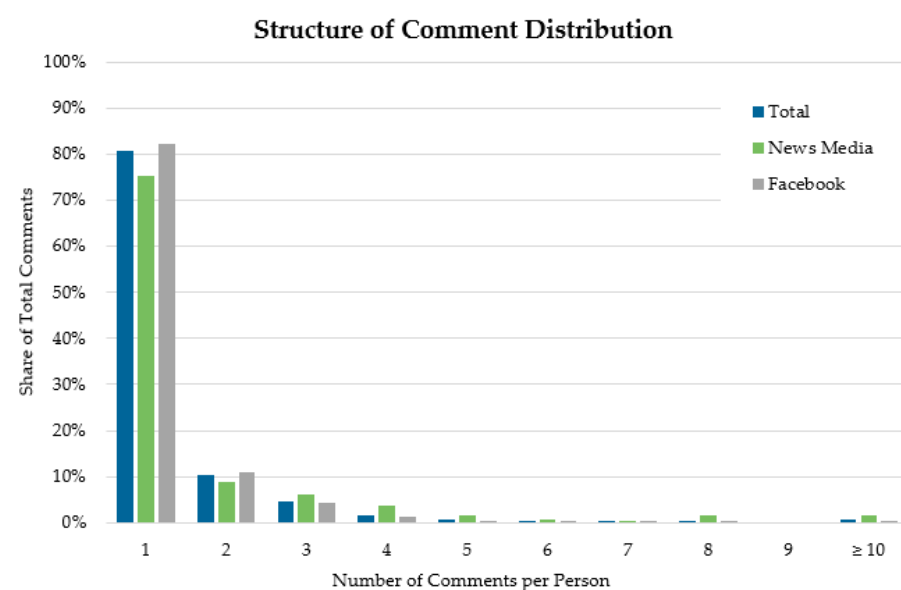


Figure A1. Structure of comment distribution.

Table A1. Structure of comment distribution.

Comments per Person	Total	News Media Site	Facebook
1	80.72% (875)	75.20% (185)	82.24% (690)
2	10.52% (114)	8.94% (22)	10.97% (92)
3	4.52% (49)	6.10% (15)	4.29% (36)
4	1.75% (19)	3.66% (9)	1.19% (10)
5	0.74% (8)	1.63% (4)	0.48% (4)
6	0.37% (4)	0.81% (2)	0.12% (1)
7	0.28% (3)	0.41% (1)	0.24% (2)
8	0.46% (5)	1.63% (4)	0.12% (1)
...
10	0.18% (2)	...	0.24% (2)
...
15	0.09% (1)	0.41% (1)	...
...
18	0.18% (2)	0.41% (1)	0.12% (1)
...
23	0.09% (1)	0.41% (1)	...
...
34	0.09% (1)	0.41% (1)	...
	100% (1084)	100% (246)	100% (839)

Note: "... " equals empty cells; number of commentators in parentheses; one name was identical and used on the news media site and Facebook; therefore, the sum of the news media site and Facebook counts one person more than the total count.

Appendix B. Code System

Table A2. Code system.

Inductive		Deductive	
Sub-Codes (Initial Codes)	Codes	Sub-Themes	Main Themes
Satisfying Hunger	Satisfying Hunger		
Bändern for Monetary Reasons; Comparison/Distinction of Homelessness	Life Situation of the Consumer	<i>Preventing Hunger</i> through the Consumption of Other Consumers' Plate Leftovers in Emergency Situation	Attaining <i>Physiological Needs</i> through Satisfying Hunger
Throwaway Society / Affluent Society	Socioeconomic Status of Residency		
Poverty	Legitimization through Securing Existence		
Unfair Behavior	Social Fairness		
Health Risk; Diseases; Health Promotion	<i>Perceived Health Risk</i>	Perceiving <i>Health Risk</i> through the Consumption of Other Consumers' Plate Leftovers	Attaining <i>Safety Needs</i> through the Protection of Individual Health and Social Order
Contamination Source; Hygiene	<i>Natural Contamination</i>		
Modification of Leftovers	<i>Deliberate Contamination</i>		
Disgust	<i>Disgust</i>		
Leftover Appearance	<i>Leftover Appearance</i>		
Partner; Family; Friends; Acquaintances; Work Colleagues; Strangers; Sympathy / Interpersonal	<i>Relations Proximity</i> to Contamination Source		
Visual Appearance	<i>Physical Appearance</i> of Contamination Source		
Eating Habits; Comparison/Distinction Physical Touching (Comparison/Distinction Kissing; Comparison/Distinction Sexual Activities); Comparison/Distinction Dumpster Diving	<i>Physical Proximity</i> to Contamination Source		
Perceived Ownership; Entitlement to Leftovers No Longer Exists	<i>Perceived Ownership</i> of Plate Leftovers		
Fundamental Criticism of the Legal Framework; Protection Mentality; Bureaucracy; Possession and Ownership Claims; Liability; Theft; House Rules / Domiciliary Right; Comparison / Distinction Legal Situations; Hygiene Regulations; Responsibility of the Bänderer; Responsibility of the Cafeteria	Legal Aspects		
Economic Damage	Economic Damage for the Health Care System	Creating <i>Social Disorder</i> through the Consumption of Other Consumers' Plate Leftovers	
Harm from Bändern; Subsidizing the Cafeteria; Cost Benefit from Ribboning; Profit-Oriented of the Cafeteria	Private Sector Damage		
Skepticism Toward Leftovers; Unpleasant; Alienating; Undignified; Contradicts Rules / Norms / Codes of Conduct	Social Norm of Eating Culture		
Dissemination of the Phenomenon "Bändern"	Prevalence of the Behavior		

Table A2. Cont.

Inductive		Deductive	
Sub-Codes (Initial Codes)	Codes	Sub-Themes	Main Themes
Making Friends; Sense of Community	Being Part of a Community	Experiencing a <i>Sense of Community</i> through the Consumption of Other Consumers' Plate Leftovers	Attaining <i>Belongingness Needs</i> through a Sense of Community
Differentiation from Others (In-group/Outgroup)	Experience of Exclusion		
Protest; Rebellion	Gaining Individual Attention	<i>Seeking Attention</i> through the Consumption of Other Consumers' Plate Leftovers	Attaining <i>Esteem Needs</i> through Gaining Attention and Protecting Self-Respect
Wanting to Prove Something/Putting Yourself on Display	Demonstrating Values		
Shame	Losing Self-Respect	<i>Threatening Self-Respect</i> through the Consumption of Other Consumers' Plate Leftovers	
Pride	Gaining Respect from the Community		
Idealism/Moralism	Strengthening Idealism	<i>Pursuing Idealism</i> through the Consumption of Other Consumers' Plate Leftovers	Attaining <i>Self-Actualization Needs</i> through Idealism and <i>Self-Transcendence Needs</i> through Reducing Food Waste
Do-gooder; Unrealistic	Do-Gooder		
Inconsistent Behavior; Hypocrisy; Self-Enhancement; Conscience Calming;	Self-Elevation		
Personal Enrichment	Freeloader	<i>"Saving the World"</i> through the Consumption of Other Consumers' Plate Leftovers	
Neutral View Food Waste; Problem Clarification Food Waste; Problem Negation Food Waste	Understanding Food Waste/Food Waste Consequences		
Reduce/Prevent Food Waste	Reducing Social and/or Environmental Impact		
Create Attention/Awareness; Be a Role Model; Bring About Behavior Change	Helping Others to Reduce Food Waste		
Prohibition of Bänder; Interventions Against Bänder; Other Destructive Reactions	Prevention of Bänder (by the Canteen)		
Refusal to Allow Access to Leftovers; Other Destructive Responses	Prevention of Bänder (by Consumers)		
Bänderer Fee; Bänderer Contract; Signs; FairTeiler for Leftovers; Leftover Exchange Table; Provide Microwaves; Other Solutions	Support for Bänder (by the Canteen)	<i>Interventions to Encourage or Discourage Consumption of Other Consumers' Food Leftovers</i>	
Passing on Leftovers Directly to Bänderer; Direct Approach; Bänderer Ribbon (Obvious Identifier of Sharing Interest); Other Solutions	Support for Bänder (by Consumers)		
Adjust Portion Sizes; Offer Buffet Style/Pay by Weight; Adjust Pricing Policy; Improve Quality (Taste/Appearance); Analyze Leftovers; Adjust Production; Donate Food/Leftovers; Other Solutions	Prevention of Plate Leftovers (by the Canteen)		
Cooking for Yourself; Assessing Your Own Hunger; Putting Less on Your Plate; Using Second Helpings; Emptying Your Plate; Education/Training on Handling of Food	Prevention of Plate Leftovers (by Consumer)		
Reuse of Excess Ingredients; Reuse of Excess Dishes; Reuse of Leftovers	Alternative Reuse Options for Plate Leftovers (by the Canteen)		
Sharing Food Before Eating; Having Leftovers Wrapped/Packaged; Taking Leftovers for Pets	Alternative Reuse Options for Plate Leftovers (by Consumers)		

Note: term in italics are displayed in Figures 2 and 3.

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