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Waste in Zero-Waste Households: The Power of Materials and Norms in Everyday Consumption

COLLECTION:
MULTIPLICITY IN THE WORLD OF WASTE

RESEARCH

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ABSTRACT

This research examines the challenges of everyday waste minimization of 'zero waste' practitioners in Chinese cities. Drawing on 45 in-depth interviews and virtual ethnography of a zero-waste community, this article details the processes during which different types of waste were 'inevitably' produced in everyday practices, such as those related to shopping and gifting, food provisioning and eating, binning and composting. Using theories of social practice, this article turns away from focusing on individual awareness, behavior, and choice, and instead seeks to explain how practices that people come to perform can be reproduced and reinforced despite individuals' commitments to change. The findings illuminate how waste generation is subject to culturally and collectively constructed norms and rules, key social relations of love and care, and is embedded in the material arrangements that make up everyday life. The research sheds light on the importance of paying attention to both the more routinized and reflexive aspects of everyday life, and the power of diverse actors in affecting and shaping daily activities of consumption and waste.

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1. INTRODUCTION

Waste reduction is a central theme in the global efforts toward transitioning to more sustainable and just societies as demanded by multiple Sustainable Development Goals of the 2030 Agenda. Across the world, a considerable number of citizen-consumers are getting increasingly concerned over waste and its environmental and social impacts. Yet, reduction of post-consumer waste faces significant challenges, and overwhelmingly, these challenges have been framed as an issue of individual attitudes, beliefs, and choices (Shove, 2010). Such views have been convincingly criticized for their tendency to individualize responsibilities and make consumers the scapegoat (Akenji, 2014; Maniates, 2001; Shove, 2010). The consequence is often the development of fractured, piecemeal measures that fail to address the complexity in shifting everyday consumption (Southerton and Yates, 2014).

Aiming toward the normative goal of understanding how waste-reduction efforts of environmentally conscious citizens could be further enhanced so that overall waste volumes are reduced, this article builds on the growing body of research that approaches consumption as the organization and dynamics of social practices (Shove et al., 2012; Warde, 2005). The social practices perspective suggests that consumption (and therefore waste generation) is less a matter of individual choice, and more an outcome of collectively organized practices, inscribed with prevailing standards of appropriate conduct and prefigured by the material arrangements of everyday life (Shove et al., 2012; Warde, 2005). Such an approach acknowledges the different sources of 'agency' that reside outside of the individuals and appreciates the power of the socio-cultural and material forces that underpin consumption and waste generation.

Against this backdrop, this research studies individuals and households who commit to 'zero waste' in China and asks the following question: how does waste come to be produced in households in which pro-environmental beliefs, attitudes, and behaviors already prevail. 'Zero waste' (hereafter ZW), in this context and for this paper, refers to a series of sustainable practices that put waste minimization at the center. It seeks to transform various aspects of the everyday life – from the way people shop, cook, eat, and clean, to the ways they dress, move, and entertain – so that less waste, and accordingly less material and carbon footprints are produced. 'Zero' is better understood as the goal that guides everyday actions than as a description of the reality under which absolute avoidance of waste is achieved. Since its rise in early 2010s, ZW has been embraced by people in many parts of the world, including urban China.[1] This study engages with a specific ZW community known as GoZeroWaste (*linghuo shiyanshi*). Founded in 2016 by an environmental activist, GoZeroWaste has been steadily attracting followers across the country. As of early 2022, the community has 21 city-chapters and more than 10,000 members, making it the largest and most vibrant ZW community in China. By examining the circumstances under which waste was 'inevitably' generated, this article seeks to illustrate how everyday practices that people come to perform can be reproduced and reinforced, which holds back waste reduction despite individuals' strong intentions to change. In the meantime, it endeavors to inform policy measures through identifying the different actors (such as relevant cultural norms and specific material arrangements) that could potentially disrupt these 'sticky' practices (Shove et al., 2012) and enhance outcomes of waste reduction.

The next section introduces the multiplicity of meanings of waste in ZW and its analytical implications. I then explain the conceptual approach which I also relate to a literature review on waste and consumption, followed by a discussion of the research site and the virtual methods employed. The results section details the processes during which waste was produced in three sets of everyday practices: those related to shopping and gifting, food provisioning and eating, and binning and composting. The discussion section summarizes the arguments presented and proposes ideas to better support individual and collective efforts in household waste minimization.

2. UNDERSTANDING ZERO WASTE: ANALYTICAL CONSIDERATIONS

Previously, the term ZW is almost used exclusively by experts and professionals specializing in industrial and/or municipal solid waste (MSW) management, and most academic literature approaches ZW from this specific angle (e.g., Colon and Fawcett, 2006; Connett, 2013; Hannon and Zaman, 2018; Lehmann, 2011; Lehmann and Crocker 2013; Pietzsch et al., 2017; Song et al., 2015; Zaman, 2015; Zaman and Lehmann, 2013). Since ZW has now travelled into ordinary households, Klug and Niemand (2021) have criticized that existing literature omits the consumer perspective on ZW. While there are a vast number of studies across disciplines that investigate food waste and other waste-related behaviors such as recycling, upcycling, and repair, ZW as a holistic set of consumption practices has not been widely studied to date, with a few exceptions in recent years (Bissmont, 2020; Klug and Niemand, 2021; Ramjaun, 2021). Admittedly, ZW practices overlap with those promoted by other 'simple living' initiatives, such as downshifting (e.g., Kennedy et al., 2013; Schor, 1998), thrift (e.g., Bardhi and Arnould, 2005; Podkalicka and Potts, 2013), voluntary simplicity (e.g., Alexander, 2011; Alexander and Ussher, 2012), and lifestyle minimalism (e.g., Meissner, 2019). These initiatives tend not to give waste and its environmental impacts extra attention, and accordingly,

the 'stuff' of waste has been set aside in these studies. In the coming paragraphs, I draw from material culture, consumption, and discard studies and aim to contribute to analyzing ZW as mundane practices performed by ordinary citizens, which I believe has not been sufficiently dealt with in existing relevant studies.

Waste has various conceptualizations within and across disciplines (Moore, 2012; Reno, 2018). How people come to recognize and define as waste is culturally, geographically, and historically constructed. Within the ZW movement, individuals and communities of practice embrace different understandings of waste. Based on my empirical work on the discourses and activities of ZW, I tease out several key understandings that are frequently put forward. These understandings of waste are represented in three particular translations of the term 'zero waste' in Chinese: first, ling laji (meaning zero trash or garbage); second, ling feiqi (zero discard or abandonment) and third, ling langfei (zero 'wasteful' or squandering).

The first understanding relates to the 'stuff' of waste, and often denotes an end point in the consumption process: for example, a mass of organic material in the compost collection facility, sealed bags of garbage sent for landfill or incineration. ZW aims to prevent the generation of waste as such that are most likely "beyond salvage" and "out of the hands" of ordinary citizens (based on interviews). The second understanding of waste relates to things that are conventionally considered to be of no immediate use – such as things that are broken, left-over, residual, or undesired – basically, things that many in affluent societies discard without second thoughts. Waste in this sense might be food scraps that could be saved to make vegetable stock, empty food jars that could be cleaned for future use, or torn clothes that could be redesigned, to list a few. ZW challenges the fixed negative valuation of these things and suggests that they could avoid the trajectory of becoming waste (as in the first understanding) through mindful consumption (e.g., reuse, repair, and upcycling). Further, ZW questions the overwhelming positive value attributed to the new and the novel (Campbell, 2014). This brings me to the third understanding of waste – as in excess. This meaning concerns the very front-end of consumption – acquisition – and waste is produced when purchasing allegedly unnecessary goods. Goods that many would come to value – the latest digital gadgets, fashion pieces in vogue – are deemed as waste by ZW practitioners. This understanding is somewhat congruent with Veblen's (1899) analysis of 'conspicuous consumption' as waste, except that ZW embraces a broader conception of waste to include not only luxury goods with similar serviceability to their cheaper counterparts, but also goods that are new in general (without traces of previous use). These goods become 'matter out of place' (Douglas, 1966) – presenting themselves as troubling signs that challenge the established normative order carefully built around the ethos of simplicity, sustainability, and authenticity in the everyday life of ZW practitioners. Just as 'one man's trash is another man's treasure' (Thompson, 2017), one's treasure might as well be another's waste.

The multiplicity of meanings of waste demonstrates that ZW goes far beyond activities associated with disposal, rather, it engages with many different stages of consumption. The ZW mantra of refuse, reduce, reuse, recycle and rot (known as the '5 Rs') encapsulates this idea perfectly. As explained by Bea Johnson, an acclaimed ZW activist, the '5Rs' implies *refusing* what we do not need, *reducing* what we actually need, *reusing* what we consume, *recycling* what we cannot refuse, reduce or reuse, and *rotting* (composting) the rest (Johnson 2016:13–35).[2] The primacy of refuse, reduce, and reuse reveals that ZW is as much about modifying consumption as it is about changing the management of post-consumption waste. Theoretically, this implies that waste will be better understood if it is examined as an integral part of the whole consumption process. By whole, I refer to the fact that ZW involves a wide array of practices that are dedicated to both the more visible activities of consumption, namely acquisition, appropriation, and appreciation (Warde, 2005) and their less visible counterparts such as devaluation, divestment, disposal (Evans, 2012, 2018), as well as repair and maintenance (Gregson et al., 2009a). Further, activities related to anti-consumption and the prevention of acquisition (e.g., refuse) are equally important. As Hetherington (2004: 159) argued, 'social relations are performed not only around what is there but sometimes also around the presence of what is not'. Through the empirical work, I explore how multiple types of waste (related to different understandings of waste) was generated in varying moments in the whole consumption process.

3. CONCEPTUAL FRAMEWORK

The previous section laid the foundation to approach waste as an integral part of the whole consumption process. Theories of social practice have been widely applied in the sociology of consumption to examine consumption as mundane phenomena. And I engage with practice theories as a heuristic device to analyze ZW at home. I also draw from material semiotics approaches, based on material culture and discard studies, to further enrich a practice-based analysis. In employing this approach, this article sets aside the extensive body of research on pro-environmental *behaviors* from cognitive psychology; it is not the intention of this article to engage in a critical appraisal of different heuristic approaches, rather, it seeks to provide an alternate understanding of environmental behaviors.

3.1 PRACTICE THEORIES AND EVERYDAY CONSUMPTION

Theories of social practice of today are largely influenced by the work of Bourdieu (1987, 2000), Giddens (1984), Schatzki (1996, 2002), and Reckwitz (2002a, 2002b). Giddens (1984: 2) claims that the core subject of the social sciences 'is neither the experience of the individual actor, nor the existence of any form of social totality, but social practices ordered across space and time'. It follows that practices constitute the site of the social and practices become the basic ontological units of analysis (Reckwitz, 2002a). Accordingly, practice theories set out to understand 'social life' as transpiring through nexuses of organized and routinized activities (doings and sayings) known as practices (Reckwitz 2002a; Schatzki, 2002). Their performances entail the integration, activation, and coordination of heterogenous components (also known as elements), such as meanings and understandings; rules, principles, and norms; knowledge and competences; materials (objects, devices, artifacts, things, technologies, infrastructures, etc.); ends, goals, and emotions (Reckwitz 2002a; Schatzki, 1996, 2002; Shove et al., 2012). From the perspective of practice theories, everyday life consists of a wide range of interconnected practices, such as eating, shopping, homemaking, working, and parenting.

The growing popularity of practice theories in the sociology of consumption since the late 1990s was in part a reaction to the alleged dominance of a post-modern understanding of consumption which has been preoccupied with the 'sovereign' consumers and the symbolic, communicative aspects of their activities (Reckwitz, 2002a; Shove, 2003; Warde, 2005). In Reckwitz's words (2002a: 258), practice theories do not 'encourage the regard of institutional complexes solely as spheres of discourse, communication or communicative action, but their consideration as routinized body/knowledge/things-patterns of which discursive practices are components'. Practice theories offered a way to approach the inconspicuous, ordinary, routine, habitual, and non-communicative aspects of consumption that have previously been sidelined by many scholars in the 'cultural turn' (Welch et al., 2020). This analytical orientation is well-suited to examine domestic practices of ZW such as cooking, cleaning, and waste sorting, in which the more inconspicuous aspects tend to be far more manifest than the more conspicuous aspects.

More importantly, seeing consumption as hardwired into the socio-materiality of everyday life as opposed an outcome of 'sovereign' individual choices, practice theories are particularly powerful in explaining why old habits and routines persist. Sahakian and Wilhite (2014) argue that the 'stubbornness' of practices depends on how deeply anchored they are in relation to the three pillars of practices: the body – including cognitiveprocesses and physical dispositions; the material world – including things, artefacts, technology, and infrastructure; and the social world – including norms, values, and institutions. The agency – the power to act on and affect practices – is therefore distributed among these different elements that constitute practices (Sahakian and Wilhite, 2014). In understanding the persistence and reproduction of practices, one also gets closer to an apprehension of how social change might happen, starting with recognizing the power that resides in a wide array of actors. Following the idea of distributed agency, I move away from focusing on human body as the chief agent which has dominated debates on sustainable consumption, and explore the power of norms and materials in both setting constraints and creating possibilities for change.

3.2 THE DISTRIBUTED AGENCY IN PRACTICES

Consumption is subject to different sets of norms and cultural conventions that shape people's tacit understandings of what's expected, desirable, and appropriate. The social construction of norms and conventions explain, to a great extent, 'why do people do what they do' and 'how they do these things in the way that they do' (Warde, 2005: 140). Many studies have explored normalization processes in consumption (for example, Gram-Hanssen, 2011; Halkier, 2009; Sahakian, 2019; Shove, 2003). Practice-based studies that focus on waste, such as food waste (Evans, 2011a, 2011b, 2012; Hebrok and Heidenstrøm, 2019; Leray et al., 2016; Schanes et al., 2018; Sotherton and Yates, 2014), waste sorting (Katan and Gram-Hanssen, 2021) and waste minimization (Bissmont, 2020) at home explored how individuals are constantly confronted with competing normative demands around caregiving, health and food safety, domestic cleanliness and order that lead to negotiations and tensions in their day-to-day actions, leading to disparate outcomes in waste generation. Paying special attention to the moments of contestations could help reveal the norms that people subscribe themselves to, which could be used to explain change and continuity in practices.

I now turn to the agency of materials from the perspective of practice theories – after all, ZW entails different ways of using, working with, taking care of, and relating to waste in everyday life. The first generation of practice theories as developed by Giddens and Bourdieu had not given much analytical attention to the role of materials (Spaargaren, 2011). However, prominent figures in practice theories like Schatzki (1996, 2002), Reckwitz (2002a, 2002b), Shove and colleagues (2003; 2013) have all sought to address material agency against the backdrop of both structuration and actor network theories (Spaargaren, 2011). Shove et al. (2013: 10) assert that 'agencies are distributed between things and people, and that social relations are "congealed" in the hardware of daily life'. Following Latour (1991,

1993, 1996), Reckwitz (2002b: 208) maintains that human beings and non-human 'actants' are 'so-to-speak "equal" components of a social practice'. Things can of course be interpreted by human agents in various ways, but at the same time they must be applied, used, and handled within their materiality (Reckwitz, 2002b). Recognizing materials as actors is to refuse the idea that they are *inert* background for social interactions or *merely* vessels for symbolic communication. As actors, they set constraints and create possibilities for practices, and have the competences to shift how practices are performed.

Influenced by science and technology studies (STS), materials (especially technologies and infrastructures) were central in many practice-based studies on domestic energy consumption. Researchers have demonstrated that the co-evolution of technological devices and their associated socio-technical systems were pivotal in shifting everyday practices, as seen in empirical studies that focus on practices of doing laundry (Godin et al., 2020; Gram-Hanssen, 2011; Shove, 2003; Yates and Evans, 2016), showering (Hand et al., 2005), indoor cooling and heating (Sahakian, 2014; Shove, 2003; Shove et al., 2013), to name but a few. Practice-based studies of household waste (Evans, 2011a, 2011b, 2012; Hebrok and Heidenstrøm, 2019; Leray et al., 2016; Katan and Gram-Hanssen, 2021) also confirmed the effects of technologies, waste infrastructures, and the materiality of goods on waste generation.

3.3 INSIGHTS FROM MATERIAL CULTURE AND DISCARD STUDIES

In recent years, more scholars propose that practice theories would benefit from a posthumanist orientation that further engages with material semiotic approaches (Evans, 2018, 2020; Gherardi, 2016; Maller and Strengers, 2019). Following this suggestion, I review key studies on waste and consumption that utilize tools of material semiotics, such as material culture and discard studies, to further enhance the analysis of materials in practices.

In *Vibrant Matter* (2010), Jane Bennett establishes the 'vibrancy' and 'vitality' of things (Bennett, 2004, 2010). On the one hand, things have their own physical lives independent from humans – 'they age, decay and deteriorate, can be used-up and/or break down or fail to work appropriately' (Gregson et al., 2007). On the other hand, things are capable of generating social effects: they are constitutive of, and to a certain extent, causal to human activities. Daniel Miller famously claimed that 'objects create subjects more than the other way around' (2008: 287). His ethnographic research makes the bold point that shopping, predominantly carried out by women/mothers, is about giving 'sacrifices' – the devoted purchases – to their beloved family members; it is through sacrifices that ideals of kinship, femininity, and parenthood are sustained and strengthened (Sassatelli, 2007: 63; Miller, 1998). Similarly, Murcott's study of cooking practices among a group of young mothers illustrates how the giving of care, materialized in the form of a 'proper cooked dinner', is central in care work (Murcott, 1982). These studies indicate that waste-reduction efforts must take into consideration the social effects that certain things (or the absence of things) are capable of generating.

Furthermore, things are generating social effects 'not just in their preservation and persistence, but in their destruction and disposal' (Isenhour and Reno, 2019, quoting DeSilvey 2007). Studies of the practices of divestment and disposition (Albinsson and Perera, 2009; Gregson et al., 2007; Gregson and Crewe, 2003), reuse and repair (Graham and Thrift, 2007; Gregson et al., 2009b) and food waste (Evans, 2011; 2012) illustrate the capacity of waste to influence and alter everyday practices that people perform. Other scholars have approached waste by investigating specific 'actant', such as waste bins and plastic packaging. MetCalfe and colleagues (2012) argue that bins interact with norms and conventions around cleanliness, aesthetics and order in domestic spaces and have the power to call householders to undertake particular practices. Hawkins (2009; 2011) illustrates how packaging – in this case plastic bottles – becomes active in the formation of new habits of consumers and acquires power in the politics of drinking water as a commodity.

To summarize, this study engages with practice theories to understand change and continuity in mundane consumption. The analysis of ZW pays attention to the roles of materials, norms, and cultural conventions in affecting practices of sustainable consumption. To further enrich the analysis of material agency in a practice-based approach, I bring in insights from material culture and discard studies and take seriously the vibrancy of materials. It is worth pointing out that this chosen approach does not afford greater power to either human or non-human actors, rather, concentrates on how different components of practices (materials, norms, etc.) work in conjunction to reproduce existing practices. To clarify, this is not to say that practices cannot be shifted or disrupted when the different actors are not *all* aligned in favor of such a change, nor that individuals have little or no power over other actors. Undeniably, reflexive individuals can create, innovate, improvise, and change practices. In the meantime, their agency is negotiated, bounded in the socio-materiality of everyday life. Therefore, through my analysis, I hope to unveil the complexity in shifting practices and point to ways in which ZW could be better promoted by identifying the diverse actors for change.

4. RESEARCH METHODS

This study is based on data derived from fieldwork conducted between 2019–2021 on the Gozerowaste community in urban China. The community is led by a network of volunteers who regularly organize events to promote ZW in their respective cities, such as secondhand swaps, ZW picnics, workshops, repair cafes, environmental film screenings, and panel discussions. Whenever possible, these events are also streamed online to attract wider audiences, especially those who live in smaller cities where a chapter has not yet been formed. Gozerowaste has built a strong online presence on Chinese social network sites (SNSs) and especially on WeChat – the most widely used Chinese SNS. On this platform, the community regularly publish articles on ZW to its subscribers; each city chapter has its own virtual group chat room, in addition to several national ones.

These virtual spaces allowed community activities to go uninterrupted throughout the COVID-19 pandemic that erupted in 2020. Platforms like WeChat are thus ideal field sites to observe people's everyday life on both sides of the screens. Following virtual ethnography methods (Bluteau, 2021; Hine, 2000, 2016; Hjorth et al., 2016; Underberg and Zorn, 2013), I immersed myself in several interconnected virtual sites. First, I joined and observed four closed Gozerowaste virtual group chat rooms (average 470 persons per group) for three months. The chat rooms were mainly used for the following purposes: sharing daily practices, exchanging tips and knowledge, facilitating same-city exchange and give-away, promoting ZW events, and discussing current events related to the environment and climate change. Second, I followed my research participants into the different virtual spaces that they were active in. For example, I participated virtually in the ZW workshops and events promoted by them, and read the articles, blog posts, and podcasts that they have forwarded. Engaging closely with SNSs allowed me to observe the 'privately public and publicly private' online lives of research participants (Baker, 2013), which would be otherwise hidden from the researchers' gaze. The observations were documented through a semi-weekly field note.

The bulk of the empirical data was derived from 45 in-depth, semi-structured online interviews with self-proclaimed ZW practitioners recruited through convenience and snowball sampling in different Gozerowaste virtual groups.[3] The interview participants are from 18–48 years of age, live in different parts of China, work in very diverse occupations and represent different income groups. A detailed breakdown of the social demographic characteristics is provided in Annex 1. Minus the six students, about half of research participants identified themselves as 'working class' (*gongxin jieceng*), with the other half identified themselves as 'normal middle class' (*putong zhongchan*). No matter how the participants identified their social class, they are very well educated compared to the general population in China: all of them have received some level of university or professional education, and ten have a master's degree or are currently pursuing one. Therefore, this sample does not include underprivileged populations. Additionally, all but five research participants are female; and based on a survey conducted by Gozerowaste, this is considered typical of the community (90% female). The preponderance of female participation in ZW reflects the entrenched gendered division of labor which still attributes domestic practices – where a great number of ZW activities take place – as a woman's responsibility.

The interview respondents were first asked to talk about how they come to practice ZW and to describe how their routines have evolved over time. When possible, I asked them to show me how they go about their ZW routines through video, and I was fortunate to be invited into many people's homes virtually and visited the different, intimate corners of their apartments. I also encouraged the respondents to share the challenges and difficulties they have encountered and asked them to reflect upon the influence of ZW on their lives. All interviews were conducted via Zoom or WeChat in mandarin Chinese. The conversations lasted from 60–180 minutes, with an average length of 90 minutes; all interviews were recorded with the participants' consent and fully transcribed, with select citations translated into English and anonymized. When analyzing the data, excerpts of discussions on scenarios under which waste was generated at home were highlighted, then a first-level coding was performed according to a codebook developed based on practice theories (e.g., materials, infrastructures, norms, culture), followed by a second-level inductive coding that marks emerging themes (e.g., familial relations, parenting, creativity). When in doubt, I verified with some research participants what they had meant and the interpretations I made; I also discussed findings with participants to check whether they resonate with them personally.

Immersion within different spaces in which the research participants were in enabled me to develop knowledge that goes beyond verbal transactions and provided a feeling of what it is like to live this way of life (Bluteau, 2021; Hine, 2016). Such an intimate research experience raises important questions about the researcher's reflexivity. As a Chinese woman who practices ZW in her own life, I was welcomed by members of the community to join as an insider. By 'insider', I mean someone who shares the belief, feels the sentiments, and relates to the struggles that accompanies the commitment to ZW; in addition, someone who speaks the language, appreciates the culture, and 'gets' the living reality and political sensitivity of sustainability issues in China. The

shared understandings were key to establish connections in the recruitment process, and crucial to building trust during the later observation stage. Further, as a young researcher educated in a European institution who was eager to learn about the local Chinese experiences of ZW, I was able to have relatively equal exchanges with the participants, many of whom, despite not having expertise in the field of sustainable consumption, were more senior in age and experience. On the flip side, the perceived social status of the researcher, as belonging to the intellectual class, might have prevented me from reaching out to wider populations in the community. I bear in mind that my positionality was an intrinsic part of my inquiry that manifests itself throughout the research process.

5. EMPIRICAL FINDINGS

In this section, I detail the processes during which waste was produced in households engaged in ZW, paying special attention to the roles of materials, norms, and cultural conventions, in three sets of everyday practices – those related to shopping and gifting, food provisioning and eating, and binning and composting.

5.1 WASTE AND PRACTICES RELATED TO SHOPPING AND GIFTING

Shopping is commonly associated with individuals and their materialistic ideals. However, everyday shopping is primarily concerned with others, especially those we love and care for. The act of purchasing goods, as Miller (1998) argues, is similar to a sacrificial ritual that centers the materialization of love and devotion. Many research participants explained waste, in this case, excess (which reflects the third understanding of waste) in relation to love and care. Peng lives with her husband, son, and two in-laws in an apartment they own in the city of Shanghai. She shared with great passion how she endeavored to reduce all 'unnecessary' consumption but was 'somewhat defeated' by the lack of cooperation of her families.

> My sister, we are super close to each other, but she just loved buying things for me! Every time she visits, bags of things arrive, food, clothes, so much of my stuff comes from her, and so many things just lie around, I cannot use them all. And I cannot give them away in the ZW groups either because it would hurt my sister. She loves buying for my child too, I cannot do anything about it, she shows her love this way. Oh, also my in-laws, always buying too many things for the child. (Interview, May 2020)

For Peng, 'waste' entered her home uninvited, inextricably tied to relations of love and cultural conventions of care. Further, she could not handle and manage waste as such using her preferred 'conduits' (donation, give-away, and swap) because it was through constant interactions with gifts that her treasured relationship with her sister got fortified. In some cases, the 'loving' un-cooperation from families turned into stubborn resistance. Cai is a university student in her early 20s living on campus. She is an enthusiastic anti-consumption advocate, and last year, she joined thousands of others in 'the year of no new clothes challenge' (*yinian ling gouyi tiaozhan*). When needed, she went to ZW swap events and charity shops to get secondhand clothes for free; she also received free food and household goods from people in the local Gozerowaste group. In this case, 'waste' (which relates to the third understanding of waste, as in 'excess') would have been created had she purchased new things (i.e., things without traces of previous use). She shared her experiences with her parents, and to her surprise, it evolved into a rather emotional event:

> My mom was furious, she yelled at me, saying how can I get personal things used by total strangers, they could pass on germs! She says she is worried that I am not taking good care of myself, she started to cry, and I cried too, it was a huge mess… Secondhand things have been a source of tension… now she insists on buying new clothes for me without asking. (Interview, August 2020)

This interaction illustrates the moral tensions at play for the consumption of secondhand goods: on the one hand, they have alleged environmental and economic benefits; on the other, there are cultural meanings attached to used goods as contaminated, outdated, and undeserving. Additionally, meanings attached to used goods meet the normative beliefs about parenting which often associate care with providing 'the best' goods for one's child, which often means the new and novel. Studies have shown general resistance toward secondhand goods in China: while most older generations grew up frugal and thrifty, they are now not as receptive to secondhand goods compared to the younger generations (Liang and Xu, 2018; Xu et al., 2014). Some research participants attributed this paradox by relating the experience of consuming secondhand goods, often out of necessity, to a shared sense of deprivation among the older generations, who now are trying to offer better care for their offspring. One participant explained:

> My mom loves telling stories of her childhood in a rural village in the '60s. She was the youngest in the family, so she never had anything new. Clothes were handed down from the first-born to

> the second, second to third, and when it was her turn, they were all worn out, patched up again and again…She educated us to be frugal, but she didn't want us to live like her, and she always tried to give us the best. (Interview, May 2020)

Tensions did not arise solely from the actions of others; many committed ZW practitioners discussed how waste was produced due to their roles as parents. Tan is a small business owner in Tianjin; like many in the community, she spoke strongly against the boom of online shopping, emphasizing the severe environmental impact brought by long-distance shipping and wasteful packaging. A typical parcel may include cardboard boxes, tapes, buffer materials (bubble wrap, Styrofoam), plastic bags, wrapping papers, bills, and envelopes – many of which are rarely reused or recycled in the country. She refused online shopping until her baby arrived. 'I have done a lot of research to find the best products for him, some you just cannot find in your city, so I go online. No matter what, I have to do what's best for my baby.'

My observation of the online groups also revealed that a large amount of the goods given away were children's belongings – their toys, books, strollers, clothes and many more – which are cluttering domestic spaces. To advertise these objects they want to give away, mothers posted photos of their children wearing the clothes, playing with the toys, reminding people of the fun, joy, and companionship these forgotten possessions once brought into their lives. From observing shopping and gifting practices, we see how waste as surplus goods entered into households as key to consolidating relations of love and care within families. Again, goods are 'chosen', 'interpretated', and handled by individuals, but they must be engaged with within their own 'vibrant' and 'distinctive' qualities (therefore not easily substitutable), manifesting the power of materials in generating and maintaining social effects in everyday practices.

5.2 WASTE AND PRACTICES RELATED TO FOOD PROVISIONING AND EATING

Preventing food waste is a crucial part of ZW, yet food provisioning and consumption involves complex coordination and performance of a multitude of practices that are subject to sets of significant and competing norms and cultural values. Murcott's seminal work (1982) documented the rituals of food followed by a group of young mothers in South Wales: a 'proper cooked dinner' should include meat, potatoes, vegetables, and gravy, served at certain hours during certain days, and eaten together as a family. Many Chinese families have routinized certain rituals in everyday food provisioning too. Xia is a savvy environmentalist in her early 30s; she works in a local non-profit and lives together with her parents, brother, sister-in-law, and nephew in a city in Southwest China. The family has made great progress toward reducing overall waste volumes, but food waste remained a challenge. Xia's father is 'the chef of the house', and she described the elaborate affair of the cooked meal in her home this way:

> He is a very demanding person when it comes to food, you know, a typical Sichuanese, each meal commands a variety of different things – meat, vegetable, fish and so on. We eat dinner all together, and for him, it has to be six different dishes plus soup, so we always have leftovers. I talked to him about it many times, but I think he just has his way of doing things, and it is very hard to change. (Interview, May 2020)

Xia described the 'N+1 food formula' (meaning the number of dishes should be at least one more than the number of people at the meal) known to many Chinese people – a cultural convention that informs what constitutes a good meal in terms of both quantity and variety. The same rule also applies when dining out: for example, another interviewee talked about how 'ordering just enough' and 'eating only vegetables' was deemed inappropriate by her family members who see abundance and variety as key to a good family meal. Waste, in this scenario, surplus food (relates to the third understanding of waste, as in 'excess', usually including food not prepared nor consumed, and edible remains after first consumption) is subject to many rules, standards and conventions (for a discussion, see for example, Arnold and Loconto, 2020; Evans, 2011a; Plessz et al., 2016; Southerton and Yates, 2014; Zhang, 2018). In Xia's house, surplus food was stored in containers in the refrigerator and served on the second day during lunch, she described the routine this way:

> My brother, sister-in-law and the kid all eat in canteens (at work or at school) for lunch, so it is just me and my parents at home for lunch. My parents usually eat the leftovers. We don't serve it to my nephew of course, whenever there is leftover on the table, my father puts the plate far away from the little one, usually in front of him and my mom… Anything more than one day old will be composted in the garden. (Interview, May 2020)

There exists a number of prescriptions of food safety and health that dictate how food should be packed and stored, how it can be reheated and presented, and when it should be discarded. Implicit norms of care and love also play an active role in the handling of surplus food. As seen in Xia's family, the spatial (e.g., where the leftover dish is placed on the table) and temporal (e.g., when the

leftover is served) aspects of surplus food consumption were arranged out of careful considerations for the child. Xia's story corroborates with arguments presented in a study of domestic food consumption: Evans (2012) explained that the materialization of love requires food to be prepared anew, and 'leftovers' potentially diminishes the capacity for food to express and constitute familial relations, which results in more food waste at home.

In recent years, ordering online food delivery has become a new mode of food provisioning, with hundreds of millions of Chinese consumers subscribed to delivery platforms and millions of orders fulfilled per day. The sheer volume of packing waste is astounding (relates to the first understanding of waste – the stuff of waste at the end of consumption process). ZW practitioners are staunch opponents of food delivery platforms, but for many time-crunched individuals working in competitive industries, the multitude of demands for convenient, economic, healthy, and sustainable food constitute major challenges for ZW. Lin works in information technology (IT) in Shenzhen and lives a '9-9-6' life (a work culture that demands employees to work from 9AM–9PM, 6 days per week). With great frustration, she explained:

> I work 10 hours, plus 2 hours of commuting, every single day. Sometimes I get off work at 9pm, do groceries, go home, cook, eat and then I have to scrub my pans at 11:30pm. It gets exhausting… So, I eat a lot of street food, but I doubt it's healthy… at least on delivery platforms you have more and healthier choices. (Interview, May 2020)

Other respondents also discussed meal prep – the practice of preparing fully-cooked meals ahead of schedule in batch, with individual portions refrigerated and reheated at mealtime – as a response to manage both time and waste more effectively. However, such practices are predicated upon having access to various facilities: they require that individuals have the necessary cookware to prepare the meal and that the kitchen can be used for an extended amount of time; they also demand ample storage room in a refrigerator at home and easy access to both refrigerator and microwave at the office. Participants talked about how the lack of access to these materials thwarted their efforts to meal prep, especially amongst the young, single ZW practitioners who share a rental apartment with a few flat mates in big cities. Another waste challenge faced by all practitioners concerns packaging waste from grocery shopping. The lack of bulk-buying stores that offer *quality* food without packaging is a concern frequently discussed. I have captured a conversation on this topic during my virtual observation on WeChat:

> Most people agree that we do not lack options when it comes to buying food in bulk (*san zhuang*), one can go to vegetable markets (*cai shichang*), small vendors (*xiao shangfan*), where there is usually food in bulk. But concerns over food safety and quality are prevalent: people have doubts over how products were sourced and what quality assurances they provide: a few people cited recent food contamination scandals. A few mentioned the 'fancier' marketplaces like the Beijing Organic Farmers Market (*youji nongfu shiji*), but they are considered too expensive for ordinary people. The most palpable option is to change the practices of mainstream supermarkets to allow bulk buying through a comprehensive plastics ban. (Field note, May 2020)

Research participants recounted their failed ZW shopping attempts at supermarkets, which remain the go-to place for fresh groceries in many cities. Most supermarkets in China have staff in charge of weighing the fresh produce for the customers, and each weighed item is supposed to be sealed in a plastic bag attached with the price tag.[4] Using one bag for all produce or bringing your own produce bags were almost always frowned upon or outright rejected by the supermarket staff, who were 'merely following guidelines and doing their job'. The supermarkets adopt a variety of regulations that govern the use of plastic packaging out of wide-ranging motives, such as increasing sales, reducing food loss, and preventing theft. In short, food and its associated waste practices are subject to collective constructed norms and rules, and the material arrangements and systems of provisions that govern food consumption.

5.3 WASTE AND PRACTICES RELATED TO BINNING AND COMPOSTING

In July 2019, Shanghai became the first city in China to *legally mandate* waste sorting at source in ordinary households.[5] The trailblazing efforts of the Shanghai municipality have kicked off a series of transformations of the MSW management schemes, with many cities following suit, but the pandemic has halted progress throughout China. Up until today, most cities still lack comprehensive recycling programs.

When public service lags behind, ZW practitioners have been actively looking for alternative solutions for recyclable waste (which relates to the first understanding of waste – the stuff of waste at the end of consumption process); some were in contact with informal waste workers to whom they drop off cleaned plastic bottles and cardboard frequently, while others went to an informal recycling workshop. My observation of the Beijing Gozerowaste group revealed another popular solution: AoBag is a new social enterprise that incentivizes recycling through technology and cash-back benefits; the company collects fourteen different types

of materials and has established collection points in Chengdu, Beijing, among other cities.[6]

> A Gozerowaste member visited a new AoBag station in Fengtai District – the first in the southern part of Beijing. She shared many pictures of the new station: it is white and green, clean, and sleek in design. She was happy that she no longer needs to go across town to Chaoyang District to drop off her recyclables. Many in the group were excited about this new development and 'petitioned' for more stations throughout the city. (Field note, December 2020)

Most ZW practitioners that I have encountered do not live near recycling facility (except for those in Shanghai). Therefore, all the above options require that individuals collect and store a large number of recyclable items before they could be passed on to the next place (to the waste worker, the recycling workshop, or an AoBag station). A problem that many people ran into was space. For those who live in small apartments in the city, the recyclables had become a disruptive force: as much as they were cleaned, stacked, organized, and put in place, people were bothered by them, couples and flat mates squabbled over them, and domestic order, aesthetics, and respectability challenged by them. The disruption brought by do-it-yourself composting systems was even more potent. Despite the uttermost dedication, excess food cannot be eliminated. And when the municipality does not collect organic waste, many ZW practitioners tried to set up their own systems. The most popular methods include indoor anaerobic compost, outdoor aerobic compost, and vermi-compost, each bringing its distinct trouble. For example, Jing had set up an aerobic composter in a distant corner in the community garden in her compound which she regularly fed, maintained, and cleaned. Still, the composter attracted flies and insects who feasted on its rich nutrients. It was subsequently reported by her neighbors as 'a public health hazard' and then 'killed' by the homeowners' committee. Lan lives in small rental apartment in Shenzhen with her husband and son; she had an anaerobic composter set up at home, much to her families' regret:

> He supports me in most of my ZW efforts, but this, he hates it! The liquid that comes out of the bucket, he finds disgusting. And when there is odor disseminating from the composter, like fermented vegetables, it is difficult for him and the child… I had to move it from the kitchen to the balcony, and in summer, I have to shut it down because Shenzhen is too hot and humid for this… I want to try vermi-compost, but no one in the family supports the idea. They think it is not worth the hassle, what's the point if no one else is doing it? (Interview, September 2020)

The transformation of the properties and qualities of food, soil and other organic and inorganic matters inside the composting bins suggests the 'vitality' (Bennett, 2004, 2010) of materials in animating social practices – they require that food scraps to be cut and prepared in distinct ways, that soil to be turned and raked with varied techniques, and composers to be put in particular places, to list but a few requirements. Yet, non-human subjects still have their own physical lives independent of human subjects (Gregson et al., 2007), as they rot and transform, they cause normative and emotional disruptions that prevent wider adoption of indoor composting for city-dwellers living in apartment buildings. Further, the very existence of isolated compost bins at home represents the failure of broader waste infrastructures to build reliable 'conduits' that channel surplus and excess food into systems of re-use.

6. DISCUSSION AND CONCLUSION

In the previous sections, I explored how multiple types of waste were generated in households engaged in ZW despite individuals' exceptional efforts. The empirical results first show how waste as surplus goods entered into households through practices of shopping and gifting. These goods, often carefully selected and purchased anew, materialize and consolidate key relations of love and care within families. They cannot be easily removed or replaced considering the relations they sustain and the socio-cultural norms that they are embedded in. Tracing domestic food practices, the findings illuminate that culturally and collectively constructed norms and rules, for example, those related to what constitute a proper meal and good caregiving, play a significant role in the production of food waste. Through exploring binning and composting practices at home, I further elaborate the agency of materials – the stuff of waste, the bins, bags, domestic spaces, and wider systems of provision – in prefiguring, enacting, and preventing waste-related practices.

The main argument developed here is that waste generation is subject to culturally and collectively constructed norms and rules, tied to social relations and embedded in material arrangements that makeup everyday life. The narrow focus on individual attitudes, behaviors and choices which dominate current policy approaches to waste reduction fail to appreciate the different actors that have the power to animate change toward more sustainable forms of consumption. Theoretically, this research suggests that waste, as an integral part of the whole consumption process, can only be understood through close examinations of both the more routinized and more reflexive aspects of everyday practices. A post-humanist orientation of practice theories helps to identify and understand the different

forces at play in both change and continuity of everyday life.

This article focuses on scenarios in which waste was inevitably produced, but many ZW practitioners have also come up with creative measures aiming to overcome these obstacles (all accounts below were based on interviews and observation). Peng, who always receives gifts from her sister, took her to a swap party in Shanghai; by experiencing second-hand shopping together, she hoped bonds could be reinforced without extra waste. To reduce food waste from her father's cooking, Xia participated in preparing the food and rationed the volume of each dish; she also tried to decorate the dishes with garnishments made out of food scraps – this way, everyone could enjoy the variety and delicacy that characterize the Sichuan family meal, but with less food wasted. Lin, the IT industry employee pressed for time, was still adamant about avoiding food delivery at all costs; she started to experiment with quick 10-minute meal recipes. I also witnessed how people went to great lengths to help fellow community members in need. A member of Gozerowaste Shanghai has discovered a reliable bulk store that produces soaps and detergents without packaging in the outskirts of the city. She often offered to take more for others in the community and then met them inside the city for the hand-over. This way, people who lacked the time or resources to make the trip could get package-free local products at no additional costs. Numerous tips on home-composting were shared in various Gozerowaste groups to help people prevent the messy, smelly situation they might encounter. While it remains unclear how successful these efforts were in further reducing waste, this article does not downplay the agency of reflexive individuals in shifting everyday practices. But broad-based movements to transform our societies cannot rely on the unfaltering devotion of individuals 'against all odds'; different actors should be enlisted and mobilized to create the enabling conditions for such a transformation.

To conclude, this research contributes to understandings of the emerging global movement of ZW by providing a local account based on the context of a ZW community in urban China. This article sheds light on the profound complexity in changing everyday consumption patterns to achieve waste minimization at home. It suggests that mainstream narratives should move away from the discourse of 'blaming and educating the consumers' toward recognizing the cultural and material organization of everyday consumption. Current policies on domestic waste reduction in China and elsewhere could expand their course of actions beyond informing behavioral change to include measures that engage with entrenched social and cultural norms and material arrangements of everyday practices, while appreciating the delicate relations of care and love implicated in waste.

APPENDIX

	N	%
Total	**45**	**100%**
Gender		
Female	40	89%
Male	5	11%
Age Group		
18–24	9	20%
25–34	23	51%
35–44	11	24%
45–54	2	4%
Marital Status		
Married	16	36%
Unmarried	29	64%
Educational Attainment*		
Bachelor's Degree	31	69%
Graduate Degree	8	18%
Some College or Associate Degree	6	13%
Occupation Classification		
Education	7	16%
Students	7	16%
Community and Social Services	6	13%
Computer and Engineering	5	11%
Home-maker/Self-employed	4	9%
Sales and Retail	4	9%
Arts, Design, Enterainment and Sports	4	9%
Business and Financial Operations	3	7%
Office and Administrative Support	2	4%
Media and Joumalism	2	4%
Personal Care and Services	1	2%
Location: City		
Tier 1: Shanghai	11	24%
Tier 1: Shenzhen	11	24%
Tier 1: Beijing	8	18%
New Tier 1 City	7	16%
Tier 2 City	4	9%
Tier 3 City	1	2%
Tier 4 City	3	7%

Annex 1 Socio-demographic Details of Interview Participants.

NOTES

1 A large number of people living in rural China might have been practicing ZW without prior knowledge of the movement. Afterall, the idea behind ZW is not new, and practices of resource efficiency and circularity have been weaved into fabrics of earlier societies across the world. This research zooms in on a specific urban community who practice and use the label 'zero waste' to describe their activities. How rural residents understand ZW is an important subject for future research.

2 The '5Rs' originated from the waste hierarchy which comprises a set of industrial and/or municipal waste management (MSW) options, preferentially ranked in terms of their perceived environmental benefits. Bea Johnson, an acclaimed ZW activist and author of the book *Zero Waste Home*, reframed the meaning of waste hierarchy for ordinary individuals.

3 A research recruitment notice drafted by the author was posted by several volunteers (introduced to the author by the founder of the community) in different chat rooms that cover both small cities and metropolitans. Anyone who saw the notice could contact the author directly on WeChat following a link to express his or her interest in the study. A small number of research participates were also recruited through referral by their friends in the same Gozerowaste city chapter. The recruitment process ended when saturation and sample diversity (in terms of city, age, and income) were deemed attained.

4 In early 2020, the National Development and Reform Commission and Ministry of Ecology and Environment of China have jointly issued the '*Opinions on Further Strengthening the Control of Plastic Pollution*'. By the end of 2020, selected cities in China have taken the lead in prohibiting and restricting the production, sales, and use of certain plastic products, such as non-compostable bags, straws, and containers. Supermarkets in many cities have stopped offering non-compostable bags at the check-out counter, but non-compostable produce bags used for fruits and vegetables are still widely used in supermarkets across the country.

5 Since 2000, waste sorting and recycling programs have been rolling out in selected cities in China, but the poor implementation and lack of enforcement have led to few successes (see, for example, Xiao et al., 2017). The vast majority of the MSW remained to be collected mixed, with the remaining waste sorted by the informal sector.

6 Founded in 2017, AoBag currently has more than 400 collection points and 30,000 active users throughout China (Aobag, 2018). Residents register with AoBag on their online application. They can purchase recycling bags online and pick them up from the collection stations; each bag has a unique QR code linked to the person's AoBag account. AoBag accept recyclables that fall under fourteen designated categories: aluminum, metal, glass, cardboard, book and newspaper, tetrapak, plastics (PET, PE, Styrofoam, hard plastic, plastic bags), electronics, and fabrics. Recyclables must be sorted and put in different bags, and the bags can be dropped off at any AoBag station anytime. Through the unique QR code, residents can get reimbursed based on the weight and content of the recyclables.

COMPETING INTERESTS

The author has no competing interests to declare.

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