Everyday practices and technologies of household water consumption: Evidence from Shanghai

<table>
<thead>
<tr>
<th>Journal:</th>
<th><em>Environment and Urbanization</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Manuscript ID</td>
<td>EAU-18-0003.R1</td>
</tr>
<tr>
<td>Manuscript Type:</td>
<td>Original Article</td>
</tr>
<tr>
<td>Keywords:</td>
<td>Social practice, China, Urban water supply, Water consumption, Water pollution</td>
</tr>
<tr>
<td>Abstract:</td>
<td>Analysis of social practices seeks to explain household consumption as a combination of technology, knowledge, and meaning within particular socio-institutional contexts. This approach challenges many of the assumptions made about how supposedly economically rational consumers behave in large-scale municipal water supply systems. Yet for an emerging body of scholarship that is sensitive to the effects of context, research on social practices is notably short of studies beyond wealthy, liberal democracies. In this paper we examine the key practices of daily water consumption for household in Shanghai, China. We identify boiling water, filtering water, and buying water as the three key practices associated with daily water consumption in the home, and explain the way each are the result of combinations of knowledge, meaning and technology. We also consider short and longer-term shifts in practices, and explain the influence of the materiality of pollution, information, and trust on these changing practices.</td>
</tr>
</tbody>
</table>

https://mc.manuscriptcentral.com/eauj
Everyday practices and technologies of household water consumption: Evidence from Shanghai

I. Introduction

By focusing on socially constructed patterns of practice, social practice research reorients analysis of municipal water supply systems to technologies, knowledge and meaning; to the actual ways in which groups of people consume water. China would seem a particularly compelling place in which to study the practices of water consumption, given its large and rapidly growing urban, middle class population, its mega water-supply and storage projects to ensure the water security of cities like Beijing, Tianjin, and Shanghai, and its widespread pollution problems. There is a growing body of social science research that asks questions about how water is supplied and managed in China, but this literature is largely framed by questions of power, institutional change, and techno-natures (see for instance Magee 2006, Nickum 2010, Webber 2012, Moore 2014, Rogers et al. 2016, Crow-Miller and Webber 2017, Clarke-Sather 2017). Specific to Shanghai, there are many studies that consider drinking water contamination and treatment (for instance Chen and Zhou 2014) or risks to water security (Chen et al. 2013, Finlayson et al. 2013), but very little discussion of how individuals or groups of people actually use drinking water. Beyond Shanghai, studies that consider Tibetan ceremonial uses of water (Nyimatashi 2017), the work of local bureaucrats in trying to secure drinking water for rural communities (Pia 2017), and the hydrosocial relations of premium supply networks (Boland 2007) only incidentally touch on some of the questions raised by practice theory.

In this paper we draw on the idea of embodied, materially interwoven practices, organised around shared practical understanding (Schatzki 2001) to examine the daily water consumption practices of households in Shanghai. In doing so we hope to provide an
alternative perspective on the broader techno-political waterscape of a Chinese megacity. We pose two primary questions: 1) what are the materials, competences, and meanings that constitute everyday practices of drinking water consumption in Shanghai; and 2) how are these practices changing? In the following section we explain how and why we have applied practice theory to everyday water consumption in Shanghai.

II. Conceptual framework

Practices are the routinised ways in which “bodies are moved, objects are handled, subjects are treated, things are described and the world is understood” (Reckwitz 2002, 250). A practice approach treats the field of practices as the place to study the nature and transformation of a particular phenomenon, such that knowledge, meaning, human activity, science, power, language, social institutions, and historical transformations occur within and are aspects of the field of practices (Schatzki 2001). When applied to water consumption, social practices research focuses not on the isolated individual, but on patterns of practice that include technologies, knowledge, and meaning. Practices are understood to be socially constructed: “the substantive forms that practices take will always be conditional upon the institutional arrangements characteristic of time, space and social context” (Warde 2005, 139). This includes the nature of the municipal (or other) water supply system in question, and the political system that governs it. A practices approach therefore complements and extends the broader literature on drinking water choice that is primarily concerned with perceptions of health risks (De Queiroz et al. 2013, Dupont, Adamowicz and Krupnick 2010, McSpirit and Reid 2011).

A social practice approach has begun to re-orient the way geographers think about the reproduction of economic space, emphasising how diverse actors organise materials, and produce, consume, and derive meaning from the economic world (Jones and Murphy 2011).
While there are examples of practice-oriented scholarship on diverse economies in postsocialist states (Smith and Stenning 2006), the majority of studies that consider householding and consumption do so in wealthy, liberal socioeconomic contexts. This includes environmentally sustainable consumption (Moloney and Strengers 2014, Delaney and Fam 2015), the intersection of materials and social practices in household adaptation to climate change (Strengers and Maller 2012), and the relations between users, objects and large systems such as Australia’s municipal water supply (Allon and Sofoulis 2006, Sofoulis 2005, Head and Muir 2007). Far less has been written about social practices in non-liberal socio-political systems, which limits the explanatory power of a social practices approach.

This is not to say that practice theory has not been productively applied to China. Iossifova (2015) considers the coexistence of various systems of sanitation and diverging everyday practices of sanitation in a spatially unequal Shanghai, while Liu (2017) uses domestic food practices as a lens for examining gendered food work and intimacy in urban Guangzhou. Nonetheless, there is surprisingly little scholarship on the everyday practices of water consumption in China. In this paper we seek to provide such evidence, examining the key practices associated with daily water consumption of households in Shanghai.

**III. Background: Shanghai’s waterscape**

Situated at the mouth of the Yangtze River, with the Huangpu River cutting through the city, Shanghai has a seeming abundance of surface water for its residents to consume. But the city’s available surface water is highly polluted. The most widely known incident occurred in 2013, when over 16,000 dead pigs floated down the Huangpu River, at the time the city’s most important water source (The Guardian 2013). According to Shanghai’s Water Affairs Bureau (2015) 54 percent of monitored sections of the river are worse than Grade III (the minimum level for potable use according to the Chinese grading system for surface water...
quality). Yet Shanghai is a leading industrial, technological and financial city that in 2014 generated 3.7 percent of China’s GDP (National Bureau of Statistics 2015). With rising incomes, it is assumed that Shanghai’s 24 million residents are increasingly concerned about water quality and other quality of life issues such as food safety (Franzen and Meyer 2010, Wu, Yang and Chen 2017).

Under China’s 2002 Water Law, Shanghai, as a centrally administered municipality, is responsible for improving domestic water supply and has its own regulations and laws governing local water issues (Cosier and Shen 2009). The management of the city’s water is the responsibility of the municipal government and its various departments such as the Shanghai Water Affairs Bureau and the Shanghai Environmental Protection Bureau, as well as key water supply companies (all state-owned except for Shanghai Pudong Veolia, a joint venture between Shanghai’s municipal government and the French company Veolia).

With the aim of improving water quality, Shanghai has embarked on two major projects in recent years. First, as pollution in the Huangpu River became more serious, authorities sought to shift the city’s reliance to the relatively cleaner Yangtze River. While there was an existing reservoir on the Yangtze – the Chenhang with eight day’s supply – the much bigger Qingcaosha reservoir (68 day’s supply) was completed in 2011, so the Yangtze now supplies 70 percent of Shanghai’s water1 (Webber et al. 2015). While cleaner than the Huangpu, the city’s 36 public water treatment plants (Li et al. 2017) must still contend with eutrophication, chemical pollution, and saltwater intrusion in the Yangtze. Second, Shanghai’s municipal government has since 2007 also started to upgrade its network of pipes, water pumps, underground water tanks and rooftop tanks in a further bid to improve water quality. It has

---

1 The water supply for Fengxian, Jinshan, Qingpu, Songjiang and Minhang districts still comes from the Huangpu River, while all other districts now receive water from the Yangtze River.
been reported that contamination through secondary facilities accounts for over half of total water quality problems (Shanghai Observer 2016).

Given these changes, do Shanghai’s increasingly wealthy residents consider the water delivered to their homes to be safe, and if not, what do they do with it? Zhen et al (2017) found that the vast majority of 5000 surveyed residents had low to medium perception of risk (67.5 percent and 24.4 percent respectively): only 4.3 percent perceived no risk, and 3.8 percent perceived high risk. Chen et al’s (2012) survey of Yangpu District residents tells us more about how people use water. In 2011, 58.25 percent of respondents were drinking tap water, 22.5 percent barrelled water, 16 percent filtered water, and 3.25 percent bottled water. Of those using filtered water, about 15.63 percent replaced their filters at least once every three months, 43.75 percent annually, and 40.63 percent less than annually. The authors also investigated the influence of demographic factors and risk perception on the types of water used by residents of Yangpu District. They found that higher income respondents and young people were more likely to use sources other than tap water (Chen et al. 2012).

Shanghai’s water is polluted, its residents consider it to be risky, and most either treat the water or seek out alternative sources. But many more questions could be asked of drinking water consumption in Shanghai: why is the use of tap water so entrenched despite strong perceptions of risk, and why has there not been higher uptake of filtered and barrelled water? In what circumstances do people seek out other options and what reasons do they give for choosing one option over another? What meanings do people attach to particular behaviours? To begin to answer these questions, this study examines the key practices associated with daily water consumption in the home in Shanghai – boiling water, filtering water, and buying water – through the lens of social practices. Before discussing our results, we first briefly outline the methods used in this study.
IV. Research design

The primary data used for this study was collected through 64 semi-structured interviews with Shanghai residents of diverse backgrounds to elicit detailed information about the use of drinking water. Participants resided in most of Shanghai’s districts (see Figure 1). In terms of demographics, our respondents also reflect the diversity of Shanghai society: 40 percent are female and 38 percent are male; age ranges from 18 to over 70; education levels from primary school only to Masters level or above; household income ranges from less than 100,000 RMB per year to more than 400,000 RMB per year; and the majority (61 percent) own their own home, while others rent or are provided with workplace or university accommodation. Another characteristic is hukou or residency status: approximately two-thirds of respondents had local Shanghai registration (either rural or urban), while the other third were registered outside of Shanghai (either urban or rural).

Figure 1: Shanghai’s districts (interviews conducted with residents in marked districts)
Face-to-face interviews (in Mandarin) were carried out by the first author between March and July 2015. The respondents were asked about their daily water consumption practices and reasons for their practices as part of a larger study of political trust and water consumption in Shanghai. The target respondents were people older than 18 years who had been living in Shanghai for at least one year. The sample is non-representative, with participants selected through the snowball method: this began with the first author’s direct contacts, who were asked to introduce friends, colleagues, and relatives. Participants were also recruited from local neighbourhood parks to balance what may otherwise have been a more highly educated, higher income selection. Where respondents were visited in their homes or communities, images were collected of the key technologies enrolled in drinking water consumption.

NVivo was used to organise and code the interview data on water consumption behaviours and reasons for water use behaviour. Three key drinking water practices were identified through coding – boiling water, filtering water, and buying water – with a collection of technologies and ideas surrounding each. Buying water includes residents who were purchasing ‘barrelled’ water (bought in bulk and used with a water dispenser) as well as smaller bottles of water.

Following Shove et al (2012), the analysis of our data is presented along two broad strands. First, we outline the elements of which drinking water practices in Shanghai are constituted. This includes technologies (household filters, purification machines, barrels, pipes, kettles etc), competences and meanings. Second, we consider how particular bundles and complexes of practice in Shanghai have persisted, and how others have disappeared. In the discussion we then reflect on the ways in which an examination of everyday drinking water practices in Shanghai (an authoritarian political context and a highly polluted environment) both speaks to and challenges existing social practice scholarship.
V. Findings: Drinking Shanghai’s water as a field of practice

In this first section of our results we discuss – as per Shove et al (2012) – the materials (things, technologies, entities), competences (skill, know-how, technique) and meanings (symbolic meanings, ideas, aspirations) that constitute everyday practices of drinking water consumption in Shanghai. We consider how behaviours, materials, and ideas coalesce around the primary ways of consuming water, which are boiling tap water, filtering tap water, buying water, or some combination of these. But before outlining the elements of each of these practices, it is important to note that we did not identify a routinised practice of drinking ‘raw’ or unboiled tap water (生水 shengshui). One respondent suggested it was fine to drink a few mouthfuls, while another that to drink it occasionally would have no health effects. Out of 64 respondents, only one 24-year old migrant worker in Putuo District appeared to regularly drink unboiled tap water in hot weather: “sometimes I drink cold tap water, sometimes I boil the water. In the hot weather, people [like me] just drink tap water directly”.

Boiling water

Boiling tap water using a standard household kettle is by far the most common approach to drinking water consumption (about 45% of respondents as their only method, and 62.5% when combined with other methods). It was also the most common method in the 2013 survey data outlined in Zhen et al (2017). This practice is fundamentally shaped by habit and appears to be fairly entrenched. A 29-year old female respondent from Xuhui District did not dare to drink the cold tap water: “I was educated to drink boiled water and that is what I always do. I think it is safe to drink after boiling.” Another replied “it’s life experience, traditional life experience; after trying different [methods], I still think boiling tap water is the best”. Indeed boiling is so common that it is not really considered to be treating the water. As a 59-year old man from Changning said: “It’s all tap water…no treatment, just boil it a bit”. It
is clear that this habitual practice is shaped by people’s past experiences, and by the practices
learned from those around them:

I always think, after so many years of being used to not drinking unboiled water, you now want me to
drop this habit? I think that’s impossible...In China, for example in one’s childhood, [if you were]
thirsty and turned on the tap to drink directly, your family would say don’t drink cold water, you’ll get
diarrhoea; so you have this feeling, like it’s not safe to drink unboiled water” (30 years, male, Hongkou)

Maybe the water quality is better than before, maybe. [If you] drink unboiled water [you’re] unlikely to
have diarrhoea; but because you’re thinking the raw water is not drinkable, then you don’t drink it.
From a young age, the family education or school education was ‘don’t drink the [raw] water’, so you
don’t drink it (59 years, male, Changning)

People have particular routines for boiling Shanghai’s water. As a 23-year old male
respondent in Songjiang explained, “I won’t drink tap water directly, unless it is boiled, and
boiled for a while. Every time I use the water I will turn on the tap and leave it running for
one to two minutes, then I collect the water and boil it”. A 35-year old man in Baoshan
District suggested that first thing in the morning, their household collects a basin of water and
throws it out or uses it to wash vegetables, and only then starts using the tap water.

Boiling water is more than just habitual: a number of respondents gave immediate safety
cconcerns as a reason for boiling tap water. This includes concerns about the water itself, but
also the larger municipal water infrastructure:

Just drink it straight [from the tap]? Certainly can’t drink it like that. Definitely boil it and then
drink…[One] knows that filtered tap water is not necessarily very clean; there can be bacteria in it. At
home there are children, so you can’t do this kind of thing [drink from the tap], or it will cause trouble
for the children (28 years, male, Songjiang)

Public announcements say [the tap water] is not clean; there are also poisonous, harmful elements in
the tap water. The tap water contains pollution from pipes, chlorine, bleach powder, impurities. It is
transported from distant places, comes down to households from water tanks; several times it passes through pollution...Boiling alleviates it a bit, the chlorine will be less (57 years, male, Changning)

You can’t directly drink the tap water, it has bacteria. In my childhood you could drink the tap water directly; after reform and opening up, the tap water is not good to drink; [there is] calcification, tap water has alum or something in it; unboiled water has a flavour (59 years, male, Zhabei)

If you’re drinking tap water in your home, and a pipe is quite old, [the water] contains microorganisms; there are probably quite a lot of impurities (30 years, male, Hongkou)

There is also a clear cultural preference for consuming boiled water. A 28-year old male respondent in Putuo District said: “I still boil it; after installing the water purifier, I still boil it to drink...I’m accustomed to this.” He later explained that for Chinese people it was not ‘suitable’ to drink water straight from the tap. A 37-year old woman in Songjiang was asked why she still boils purified water, and does so on the stove: “because my husband wants to make tea, the water has to be really boiling...like the temperature of water from an electric kettle is not hot enough; the water has to be [on a rolling boil]”. There is a common perception in China that drinking water that has a similar temperature to the body is better for you than drinking something cold. It is not possible to conclude whether these cultural preferences preceded, or developed in response to, concerns about water safety, but the practice of boiling filtered water shows a strong preference for consuming hot water.

But beyond convention and safety concerns, people’s living conditions and economic situations also fundamentally shape their practices. Some of these responses speak to the aspirations attached to particular ways of consuming water in a highly unequal city (primarily divided along lines of registered residents and migrant workers), others to the precedence of other aspects of life:

Here we are all migrant workers...if we were long-term residents here then we could buy that kind of filter, install it on the house’s main tap... that would be good. Us migrant workers, the whole family
only has one tap...This year we’re here, next year we might not be; it’s not like we’re preparing to put
down roots here…(27 years, female, Huangpu)

Other people drink Evian, I would also like to… but I don’t have the money; I just have to drink boiled
tap water (approx. 40 years, male, Zhabei)

We don’t have the conditions to be fussy [about water]…I just want to make more money and send it
back to my family…the conditions in our dormitory are very poor (24 years, male, Putuo)

The consumption of boiled tap water is also shaped by negative perceptions of the other
options available: store-bought water and various forms of filtered water. As a 55-year old
man from Yangpu explained, “We don’t buy large bottled water; it is said that nothing is
better than tap water. The news on the Internet said that about 60-70 percent of bottled water
does not reach the quality standard, so I think tap water is better; we always boil tap water”.A 47-year old man in Songjiang explained why his family had not installed a filter: “we just
boil water to drink…the cheap [filters] are useless, the expensive ones are several thousand
[RMB]”. Another respondent suggested that tap water at least reached some standard,
whereas with barrelled or spring water included some “inferior brands” and you did not know
where the water came from. It might be produced in some “small workshop”, which means
you are unable to say what the quality is. Others suggested that some bottling plants were
running “black” operations. Yet another respondent perceived bottled water to be stagnant:

I think tap water is better than bottled water. Tap water flows; in contrast, you do not know how long
bottled water has been stored for, or where it is from. Sometimes if you cannot use it up in ten days it
goes mouldy… I think tap water in Shanghai is better than before. It used to have some strange taste
and impurities; now the sediment is less than before (65 years, male, Changning)

Clearly, a key element of the practice of boiling water is information gleaned from different
sources about the safety and trustworthiness of tap, bottled, and filtered water. It is interesting
to note that these sources do not typically include the government. As a 30-year old man in
Jingan District noted, “Even if the government knows that some indicators exceed the standard, they won’t tell the public because it is not good for maintaining social stability (维稳 weiwen)”. An 80-year old woman in Yangpu explained that they only drink boiled tap water because a health expert on a TV program said that boiled water is the healthiest water. She also followed the program’s advice to collect tap water in a bucket and let it stand for 1-2 minutes, then boil it, and once boiling, open the lid for 1-2 minutes to release the chlorine. A 37-year old woman in Songjiang District, by contrast, was told by a friend who works in a water plant that there are no big differences between tap water and filtered water; the main pollutants are still there after filtration. So she stopped using a water filter and now boils tap water instead. So here we see an everyday practice – boiling drinking water in Shanghai – coalescing from various entities such as taps, kettles, and pipes, particular forms of knowledge (drawn from different sources) such as custom and markers of safety, and particular meanings such as aspiration, and stagnation versus flow.

Filtering water

There is a large and growing water purification industry in China. There are hundreds of water filter brands (see for instance Figure 2), which are heavily marketed to a rapidly urbanising population. Household filters are now common in Shanghai, but what our data shows is that they are not necessarily used on their own, nor are they used for all household purposes. A 60-year old man in Changning District explained that whereas before he had drunk boiled water, for the past two years he had used a water filter: “there are quite a few kinds of filters – installed on the faucet, also pot [jug] filters - I use both of these”.

Figure 2: Examples of household filters available from online stores (Source JD.com)

As a key material element of everyday practice, water filters themselves warrant attention. Some users have adjusted their behaviour and manage the filter without any problems. For others though, the use of (often imported) filters in Shanghai presents problems, which tend to accumulate over time:

Now people’s environmental consciousness has increased, people demand higher quality water. Our house, we installed a filter, fourth generation, imported from the US. [We] drink directly from the tap…once a year we change the small [filter] core, after four years we scrap it (57 years, male, Changning)

The house has a purified water system installed inside. It was in use from October last year, but now I don’t dare to use it; it’s said that the core needs to be changed once every six months; I haven’t called anyone to change it, so now it’s useless; we still use the tap water. (37 years, female, Songjiang)

Those domestic water purifiers you buy from Germany, they say the filter needs to be changed once every six months. But in China, after three months [the filter is] already very dirty; in this kind of
situation you know that the tap water is very dirty, how could you dare to drink it? (30 years, male, Jingan)

Concerns are also emerging about the quality and trustworthiness of household filters, though not to the extent of bottled water (see below). When asked why he had not installed a household filter, a 35-year old man from Baoshan said: “At first, last year, I thought about it; later I discovered these things are a gimmick. Recently isn’t it said that some water filters do not comply with standards? [this kind of news]...it’s shared on WeChat Moments.”

Another filtration option in some parts of Shanghai is coin-operated community purification machines, through which mains water is filtered into large bottles (see Figure 3). Not all communities have them, and they do not appear to be widely used: only five respondents were using this option as their main source of drinking water. A 30-year old man from Putuo uses the community machine instead of boiling tap water: “A post on the Internet compared tap water and purified water, and the conclusion was that purified water is cleaner. You can see the dirty things collected by the filter. So I buy the community purified water.” He also considered it to be a cheaper option to store-bought water:

> There is a purification machine in the neighbourhood, a very big machine; all the neighbourhoods around here have them. It’s cheaper than barrelled water... I use this for my drinking water; but for cooking, washing vegetables etc, I still use tap water. The neighbourhood [machines] are very cheap, 100 RMB for more than half a year of drinking water.

These community machines also fit into people’s seasonal preferences. A 38-year old woman in Xuhui had a coin-operated filter in her neighbourhood. She said that while they normally consume boiled tap water, in summer they will occasionally use the machine for cold water that can be consumed straight away. She considered it to be about the same as store-bought spring water.
For others though, while cheap, the machines were considered inconvenient. A 27-year old woman in Huangpu did not use her community’s machine as she lived on the sixth floor with no lift, and did not want to carry the heavy bottles upstairs (she drank boiled tap water instead). Others outright rejected these community purifiers, saying that they did not trust that they were properly maintained, and that boiling or filtering tap water were better options. The installation of these machines is supposed to be reported to the health department and maintenance is the responsibility of the franchisee, but it seems that not all machines are reported or properly maintained.

![Figure 3: Community coin-operated water filters (Images: Zhen 2015)](image_url)

So the practice of filtering water again brings together a set of entities - local and imported household filters, filter cores, community filters - with questions of trust in these entities, and new behaviours centred on maintaining filters. It also points to questions of competence and agency in being able to successfully treat the water.

*Buying water*
The practice of buying water includes both small bottles, and larger barrelled water connected to a water dispenser used in homes and offices (see Figure 4). Typically, people still boil this water for drinking, particularly in winter. A relatively small number of respondents interviewed in 2015 engaged exclusively in this practice. A 64-year old man in Huangpu had become accustomed to drinking barrelled water: “because tap water, to some extent the city adds some kind of bleach; to disinfect [the water]; this is our understanding of it”. A 48-year old woman in Hongkou used only bottled water for both drinking and cooking. She said:

> We feel that the tap water is not quite clean, so we started to use barrelled water with a water dispenser for drinking and cooking; for many years… If you boil water and drink it, it has a distasteful flavour. Bottled water does not have that tap water flavour.

Others, such as a 75-year old woman in Huangpu, purchased water for drinking, but would change to tap water for cooking: “tap water has a flavour, even after boiling I still feel it has some flavour. Shanghai’s water is not very clean, not clean, not clean”.

![Image of bottled water in a shop and barrelled water in a respondent's home](Images: Zhen 2017)

**Figure 4: Bottled water in a shop; barrelled water in a respondent’s home (Images: Zhen 2017)**

Again, the use of store-bought water can be seasonal, or otherwise sporadic. As a 30-year old male respondent in Hongkou explained, “bottled water and tap water are used fifty-fifty [in my home]. In winter we usually drink hot water [boiled tap water]. In summer we just buy...
bottled water and drink it directly”. A 36-year old woman from Xuhui, while primarily using barrelled water for drinking, expressed some reservations: “it seems that with pure barrelled water, a lot of materials are lost through the filter; to continuously drink [this water] is not healthy, right? So [we] also boil tap water to drink. [We] don’t drink unboiled tap water”.

Purchasing water was also a short-term response to well publicised events:

At that time, a chemical industry ship capsised on the Huangpu River - chemical pollution - during that time, [I was] a little uneasy; occasionally [there are] emergencies… at that time for several days I drank bottled water; after some time had passed, I again used tap water (28 years, male, Songjiang)

If these large-scale pollution incidents happen, I should change [what I drink]…for a concentrated time I might go to the supermarket and frenetically buy bottled water, for those few days; after that, the supermarket runs out… I’ll go back to traditional tap water. Even if [the pollution incident is] influential, it’s only like that for a few days (49 years, male, Songjiang)

There is some evidence to suggest that people are shifting away from the practice of buying water. One reason given was cost:

Before, when Nongfu Mountain Spring [a popular bottled water brand] was cheap, we would buy Nongfu to drink; it’s natural water, right? Natural water is certainly good. Now, Nongfu doesn’t have those big packages, [I] feel that the quality-price ratio is not high, so I just use a jug filter (53 years, male, Hongkou).

Indeed, there are huge discrepancies in price. In Shanghai, popular brands of 19-litre bottled water range in price from 15 to 24 RMB, while community purified water costs about 1.5 RMB per 7.5 litre bottle. By comparision, in 2015, Shanghai’s residential water cost 0.00345 RMB per litre. This might help to explain the prevalence of boiling tap water. But regardless of cost, it appears that people are increasingly concerned about the quality and trustworthiness of store-bought varieties:
Tap water compared to barrelled water, even compared to mineral water, is cleaner, because tap water, everyone is using it [so] it circulates; that barrelled water, you can’t see how long it’s been stockpiled, how it has been treated, where it has been transported from. Have additives been put inside? If not, how can it be stored for that long?…so now Shanghai even has some barrelled water that is bottled here [using] tap water that has been filtered a bit, or secretly using wells on the outskirts (60 years, male, Changning).

At the beginning [bottled water] wasn’t bad; now don’t you look at the quality available outside [and think] they’re all fake brands? We don’t have confidence in them…it’s all just bottled tap water, right? (47 years, female, Putuo)

While buying water can be an exclusive practice, it is not as prevalent as boiling or filtering tap water. Rather, it is more commonly something that people resort to at particular times – when cold water is desired or when pollution incidents cause concern about tap water – or for taste preferences. While safety concerns are also evident for tap water and filtered water, our data shows a shift in attitudes towards bottled water, with significant concerns about where the contents of these bottles and barrels is sourced from, and how it is treated.

**Formation, persistence, disappearance**

In this second section of our results we consider how particular practices of drinking water consumption have formed, persisted and disappeared. Our data is primarily a snapshot in time, but respondents did also reflect on their past practices, which points to certain changes in how drinking water is being consumed in Shanghai. The results of other studies, particularly Zhen et al (2017) and Chen et al (2012), also provide some guidance about changing everyday practices.

What is evident from our analysis is that certain ideas and meanings that constitute everyday practice in Shanghai are highly durable. These include a preference for consuming hot water, a belief in the efficacy of boiling water, and a belief that untreated tap water is not safe for
consumption. The practice of boiling water is stabilised through repeat performances, and
further ingrained by the way drinking water consumption is shaped from childhood. Of
course for some people the durability of certain practices was not about ideas, but about other
practices not forming. Some migrant workers, for instance, simply did not have the option of
installing filters or purchasing water.

Not all practices prove so durable. Given the much higher rates of purchasing water in the
2011 and 2013 surveys outlined by Chen at al (2012) and Zhen et al (2017) respectively, our
2015 interviews suggest that the consumption of bottled water is declining and importantly,
show some of the reasons why this might be happening. The rise of filtration as an industry in
recent years is important, increasing the availability of new local and imported products – the
industry is reportedly growing by 40 percent per year (Tao and Xin 2014) – but so are
changing perceptions of the quality and trustworthiness of bottled water. Given nascent
concerns about unregulated water purification devices though, it is unclear whether the
filtering of tap water will endure as an important everyday practice. Much will depend on the
performance of material entities enrolled in this practice and the ways that people adapt to the
demands of these technologies. Much will also depend on trust, in providers of filters, in
providers of bottled water, and in government water quality data or reports of chemical spills;
a defining feature of Shanghai’s waterscape.

Because of the physical (polluted) and political (authoritarian) environment in which people
live, the everyday practices of drinking water consumption in Shanghai are fundamentally
shaped by how people manage and understand risk. Thus particular markers of safety and
danger, such as smell, taste, residue, flow, and stagnation, are widespread in people’s
responses. This is different to studies of water consumption in developed countries where
people can generally expect to be provided with safe drinking water. People in Shanghai
understand that the water is not safe. While many respondents were sanguine about the
improvements to water supply, others expressed fairly despondent views. As a 57-year old man in Changning said: “So now China has a saying: “if you don’t eat you will starve to death, if you eat you will be poisoned to death”. Nowadays there are too many unhealthy things; gutter oil, melamine…” Or as a 30-year old man in Putuo said: “Even officials admit that the tap water all contains pesticides and heavy metals…Diarrhoea is a trivial matter. Now people are scared that after drinking it for five, six years they will get leukaemia, get cancer”.

With this knowledge it then becomes a question of treatment options at the household scale, and the efficacy of these options. People go to great lengths to treat their drinking water, and respond to particular events and new information by changing their behaviour. These behaviours are shaped by a variety of influences including online discussions, TV programs, family and friends, and personal experience, all of which interact with materials, habit, customs, and questions of convenience and cost. The micro-scale adaptations pursued in households perhaps give people a sense of agency. As a 36-year old woman in Songjiang explained: “we have no way to change if the water quality is not good. Report? Report to whom? About the water, except for filtering by ourselves, there are no other ways”. When asked about the quality of water from the Huangpu River a 54-year old man from Fengxian said: “there’s nothing we can do about it; otherwise what will we drink? There’s no other way but to treat it”.

While it is not possible to predict future practices, what respondents themselves raised was the sustainability of treatment options. “Now there are a lot of methods of treating [the water], for instance those filter machines and filter jugs; I believe these can treat [the water] well, but how to resolve this question of sustainability? These [methods] aren’t permanent” (60 years, male, Changning). Expressed in terms of expectations of service and progress against some
kind of external benchmark, a number of people also considered the widespread provision of
safe tap water to be unnecessary:

> It is not necessary to have directly drinkable tap water. It is too costly and there will be a lot of waste.
> Except for drinking, the water is also used for showering and washing, and it is unnecessary to bring
> the water to a drinkable level; too much waste (50 years, male, Hongkou)
>
I don’t have such high expectations for tap water. I usually just wash vegetables; for this [purpose] the
water quality is enough. I bought a purification system myself, I think it’s not necessary to change the
pipes; the government claims that after changing the pipes [you will be able to] drink directly, but I still
would not feel at ease (30 years, male, Hongkou)

As such, even if Shanghai was to supply safe, drinkable water to its residents, it is likely that
people’s everyday practices would still be fundamentally shaped by perceptions of risk, trust,
the convention of consuming boiled water, and the varying services water provides.

VI. Discussion

The lens of the economically rational consumer offers a narrow understanding of water
consumption behaviour. As Browne (2015, 416) argues, there needs to be greater
understanding of “the diversity of reasons that people currently do practices that use water,
the societal trends that underpin them, and how these practices might change over time in
unexpected and chaotic ways that will influence water consumption”. By examining everyday
practices of drinking water consumption in Shanghai this article has given insight into why
people boil, filter, and buy drinking water. But using a social practice approach in an
authoritarian political context demands some reflection. While our findings largely align with
the existing literature, we do raise several points of contention.

In line with existing literature we find that a practice approach sheds light on not just
behaviour, but broader societal shifts. In Shanghai, as elsewhere, it is the habits of interaction
with taps, filters, and bottles that provide a crucial analytical link between people and the wider socionatural network of storage and distribution (Head and Muir 2007). In this case Shanghai’s socionatural or technopolitical waterscape reflects much larger questions of pollution, trust, and social order. Discussions of filtration devices and bottled water are shot through with distrust: of the companies that produce these products and the methods they use, and of the government’s ability to supply safe water. Further, it is widely accepted that the water is undrinkable, but it is not from the government that people seek out information on water quality. People also tend to use coping mechanisms within the household to reduce the risk of consuming polluted water. However, imported household filters sometimes prove ineffective, or must be adapted by end-users, while new technologies such as community purifiers are introduced but not widely adopted. These stand-alone technologies are overlaid onto Shanghai’s reticulated, but polluted water supply, thus analysis of how water technologies and society are coproduced must be multi-layered.

Shanghai’s socionatural water network also speaks to questions of sustainability, but in ways peculiar to China. People in Shanghai simply do not drink cold water from the tap, which raises questions about the overall aim of municipal water supply. Over the next decade the city’s already massive population is projected to increase further, as is its demand for water, but it is treatment capacity, not surface water availability that is the key constraint on the city’s ability to meet this future demand (Li et al. 2017). Tao and Xin (2014) suggest that by using water purifiers in the home, China can avoid the technological lock-in of wasting potable water on other domestic uses. From a social practice perspective that recognises the different services water provides (washing vegetables in untreated water, drinking treated water in cold or hot weather, preparing tea etc), this is not an unreasonable proposition. Nonetheless there is a need to understand how these purification technologies become enrolled in people’s everyday lives and how they can be made sustainable. While this paper has begun
to illuminate these processes and potential hurdles, there is more work to be done in understanding end-user practices of cleaning and replacing filter cores, and the networks that produce and deliver these materials to people’s homes. These processes are not well accounted for in the existing practice-oriented literature on consumption. Nor is there any research that looks at the interplay of sanitation and drinking water practices in China.

One final reflection is that we should not lose sight of questions of access. Social practice scholars argue that variation in behaviour results from contrasting understandings, levels of competence and degrees of involvement, not simply socio-demographic factors (Warde 2005). We do not dispute this, but in emphasising the embodied and material nature of bundles of technologies, knowledge, and meaning, there is a risk that questions of inequality fade too quickly into the background. As Iossifova (2015) concludes in relation to sanitation in Shanghai, everyday practices and perceptions of these practices are manifestations of socio-material inequalities, particularly for low-income elderly residents and rural migrants. China’s hukou system entrenches inequality within cities, including in access to safe drinking water. Some of the migrant workers interviewed for this study were living in temporary, poor quality accommodation, and simply did not have access to household or community purification systems. Everyday practices have a social context, and in Shanghai this context is one of institutionalised discrimination against migrants, amidst an increasingly polarised society. It is therefore imperative that a practice-oriented epistemology incorporates meaningful approaches to power, such that it can help us to understand how everyday practices constitute, reproduce, or transform structural forms (Jones and Murphy 2011).

VII. Conclusion

Considering rapid urbanisation, growing public concern for quality of life issues, and increasing environmental stress in China, existing scholarship on institutions, governance,
and technopolitical systems could be usefully complemented by studies that develop practice
as an analytical object. This article has adopted a social practice approach to examine
drinking water consumption in Shanghai, outlining the complex motivations, and material
and social elements that shape daily water consumption in the home. It has highlighted the
stability of particular bundles of practice, particularly boiling tap water, and the unfixed
nature of other treatment options. While elements of everyday practices such as convention,
knowledge, and technology have been extensively described by research in other places, this
paper draws attention to distinct features of everyday consumption in China: the materiality
of highly polluted water in its interaction with technologies and behaviours, and the
pervasiveness of (dis)trust in shaping everyday practices.
References


Shanghai Observer (2016) 上海今年改造 2500 多万平方米二次供水设施，已超额 28% (This year Shanghai has transformed more than 25 million square metres of secondary water supply facilities, 28% above quota) 22/8/2017 http://www.jfdaily.com/news/detail?id=38001.


Author/s:
Zhen, N; Rogers, S; Barnett, J

Title:
Everyday practices and technologies of household water consumption: evidence from Shanghai

Date:
2019-04-01

Citation:
Zhen, N; Rogers, S; Barnett, J, Everyday practices and technologies of household water consumption: evidence from Shanghai, ENVIRONMENT AND URBANIZATION, 2019, 31(1), pp. 231 - 248

Persistent Link:
http://hdl.handle.net/11343/222007

File Description:
Submitted version