

RESEARCH

'Drinking and Dropping': On Interacting with Plastic Pollution and Waste in South-Eastern Nigeria

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Nigeria is reported as having released up to 0.34 million tonnes of plastic debris into the ocean in 2010 and ranked as the ninth country in the world for pollution of the marine environment. It is a postcolonial, oil rich country where plastic is cheap and widely available. Currently there is no government policy regulating single-use plastic products. Previous studies have identified university student residential areas as 'hot spots' for plastic waste. We used qualitative methods (focus groups and semi-structured interviews) to explore how students made sense of their single use plastics consumption (including 'pure water' plastic sachets) and analysed how young Nigerians interact with plastic waste. Students perceived plastic waste as malodorous, causing harm to human health and blighting environmental aesthetics. Students saw themselves as the cause of plastic pollution (as consumers) whereas plastic industries were framed positively as producers bringing progress and prosperity. Participants were open about their indiscriminate littering practices subverting other study findings where responsibility tends to be deflected (to policy makers, producers). While we are relying on self-reported behaviour, we found no obvious link between awareness of environmental harm caused by plastic pollution and students' actions. Within this peer group of young Nigerians, it was not considered 'normal' or 'cool' socially to use waste bins or recycle. We suggest that further research is needed into how plastic pollution is made sense of in terms of individual responsibility; lay understandings of miasmas; perceptions of public/private spaces and plastics as a signifier of modernity; and enhanced social status.

Keywords: plastic pollution; Nigeria; plastic water sachets; waste behaviour

Introduction: Conceptualising Plastic Pollution in Nigeria

Plastic waste in the ocean has emerged as a specific global problem, high on the policy agenda (Eriksen et al. 2014). In the Global North, media images of charismatic mammals (culturally familiar species with symbolic value such as whales or dolphins) ingesting or entangled in plastic waste have become a prominent symbol of the plastic pollution crisis. Environmental charities and activists use these 'flagship' images to inspire emotional engagement, raise public awareness and catalyse changes in behaviour (Macdonald et al. 2015). As Borowy (2019) notes, the problem of plastic waste is more than aesthetic. Jambeck et al.'s 2015 key paper ranked Nigeria as ninth top polluting country based on modelling that linked data on solid waste, population density and economic status. This led to calls for a reduction in waste mismanagement to prevent increased quantities of plastic entering the ocean from waste generated on land. Jambeck et al. (2015) highlighted the problem in develop-

ing African countries caused by increased population and the resulting increase in per capita consumption that is associated with economic growth.

As Dumbili and Henderson (2020) argued previously, it is no coincidence that the so-called 'top ocean polluters' who 'mismanage' waste are countries that bear the burden of significant health inequalities. Discard studies theorists rightly conceptualise waste, dirt or matter within a wider social-cultural context that foregrounds the power dynamics underpinning globalization and urbanization and is alert to how waste management infrastructures produce social order and are also intimately entangled with precarious labour, neoliberal politics, and environmental justice (Fredericks 2015; Liboiron 2016; Reno 2015). This is particularly pertinent to the social meaning of plastic pollution in Nigeria, which, as with waste management in other postcolonial countries, cannot be separated from its colonial history (Wagner-Lawlor 2018). Dirt and waste have long mediated cultural encounters in Africa (Newell 2016: 41). Contemporary waste narratives that emanate from the Global North frame plastic pollution as caused by wilful 'mismanagement' by the citizens of 'polluting countries' in the Global South and in so doing, frequently obscure the structural power dynamics of a global industrial economy.

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There is a long history of a toxic waste trade where toxic waste is exported to African states (Akpan & Bassey 2017) and 'waste colonialism' describes the disposal of hazardous wastes by wealthy countries into the territories of African countries (Pratt 2010). Wagner-Lawlor (2018) argues that as a result, plastic has a distinct social meaning in post-colonial Nigeria – a country that has been exploited in terms of natural and human resources by Western-owned fossil-fuel companies. Nigeria has thus inherited a waste culture from the West creating a disconnect between human and the natural, where 'this invasion disrupts and disorients traditional principles of cleanliness, health, and care of household and community – that is, the country's human ecology' (Wagner-Lawlor 2018: 199).

Developed and developing countries have adopted an uneven range of measures to tackle the global challenge of plastic pollution, from banning plastic bags (e.g., Kenya, Rwanda) to European Parliament legislation that will prohibit the top ten single-use plastics found on European beaches as well as fishing gear (EU, by 2021). Calls for a reduction in the volume of plastic produced remain controversial (Parker 2019), and Nigeria has yet to join other African countries in adopting policies on single-use plastic products (Adam et al. 2020) despite being among the top six importers and users of plastic (Babayemi et al. 2019). The largest market sector for plastic resins is disposable packaging (Plastics Europe 2019) and in Nigeria the production and consumption of single-use plastics is growing (Duru, Ikpeama & Ibekwe 2019). An acute scarcity of potable water in rural and some urban parts of Nigeria (Nnaji, Eluwa & Nwoji 2013) mean that non-refillable 500ml plastic sachet bags of 'pure water' (Figures 1 and 2) are popularly used for drinking water (Omole, Ndambuki & Balogun 2015) though the idea of plastic containers for water as providing an acceptable solution to 'natural water scarcity' has been critiqued (Hawkins, Potter & Race 2015). Pure water is used extensively but does not come from reliable

sources, nor do producers subject the water to requisite treatment before packaging (Nnaji, Eluwa & Nwoji 2013). Over 70 percent of Nigerians consume at least one bag of plastic sachet water each day (Edoga, Onyeji & Oguntosin 2008) generating around 60 million plastic sachets. Although most people would prefer bottled water, the cost for a household would be around ₦47,700 (around 110 euro) per month, which is prohibitively expensive given the average monthly income is ₦35,000, (around 80 euro) (Nnaji, Eluwa & Nwoji 2013).



Figure 1: Pure Water Sachets. Photo: Emmanuel Ezekwe.



Figure 2: Pure Water Sachets. Photo: Emmanuel Ezekwe.

About 42 million tonnes of solid waste are generated annually (0.49kg/capita/day (Nnaji 2015), and 20 per cent of this is made up of plastics (Akinola, Adeyemi & Adeyinka 2014), but most is neither collected nor recycled due to poor infrastructure, inadequate or unskilled human resources, and lack of political will (Kofoworola 2007). Plastic and solid wastes are dumped at illegal dumpsites, by the roadside or inside drainage channels (Adegboye 2018; Imam et al. 2008), clogging gutters and littering streets following rainfalls, and swept into the marine ecosystems by floodwater (Dumbili & Henderson 2020). Microplastics, tiny particles under 5 mm in length (SAPEA 2019), have been identified in rivers located in Eastern Nigeria (Ebere et al. 2019) and Western Nigeria (Akindele, Ehlers & Koop 2019). Microplastics in the marine food chain raises concerns about risk to human health (Barboza et al. 2018; Rist et al. 2018; Smith et al. 2018) and nano plastic particles < 100 nm of size, are the least known area of marine litter but potentially the most hazardous (due to the possibility that they can adsorb chemical contaminants to their surface) (Koelmans 2015; Stapleton 2019).

Plastic pollution in Nigeria is often assumed to be compounded by lack of awareness on the part of consumers who fail to understand the immediate or long-term impacts of mismanaged plastic waste (Duru, Ikpeama & Ibekwe 2019: 118). Most studies concerning public perceptions of plastic pollution have used quantitative survey data to measure levels of knowledge and awareness of marine litter. Lucrezi & Digun-Awet (2020) examined perceptions of visitors to Elegushi Royal Beach, an emerging tourist destination in Nigeria, and found that visitors were aware of marine litter as a global and national problem but did not perceive the local beach as being littered (images showing conditions at the beach depict discarded plastic bottles and other items). Willingness to participate in beach cleans was marginal and more likely where people shared perceptions of collective responsibility (Lucrezi & Digun-Awet 2020). The perspectives of consumers or citizens are often inferred or extrapolated from quantitative surveys exploring technical infrastructure. For example, a study of Saki in Western Nigeria identified plastic sachet water as contributing to environmental problems in the city due to indiscriminate disposal but did not explore the reasons for this (Oladimeji 2019). With a few exceptions (Anderson et al. 2016), have been dominated by quantitative research studies (Hammami et al. 2017; Heidbreder et al. 2019). These are useful in revealing *what* people think (measuring knowledge and awareness of scientific terms, or self-reported behaviours) but not necessarily *how* or *why* they think it. We build on a qualitative study that explored perceptions of plastic pollution and microplastics in the UK (Henderson & Green 2020) and identified the ways in which public understandings of plastic pollution and microplastics were highly mediated by media messages concerning health and risk as well as existing social practices (assumptions about 'normal' or appropriate behaviour). Other qualitative research has highlighted the importance of understanding the social processes which underpin how plastic 'waste' comes to be defined culturally (Brennan & Portman 2017). The current study also extends an earlier review of plastic pollution

in Nigeria (Dumbili & Henderson 2020)¹ by focusing on young Nigerians and how they interact with waste in everyday life. As sociologists with longstanding research interests in media, young people, health communications, and risk (e.g., Dumbili & Henderson 2017; Dumbili 2017; Henderson 2014; Henderson, Hilton & Green 2019), we were interested in exploring how meaning was created among Nigerian students within the social context and culturally specific environment of South-Eastern Nigeria.

Methods

Study Site, Recruitment and Description of Participants

This study was conducted in a city in South-Eastern Nigeria. It has a tropical climate, hot, humid conditions, and intense periods of rainfall for around 9.9 months of the year (February to December). Living standards have improved, and the city is now composed of traditional villages with newer housing estates and an estimated population of 337, 618 (National Bureau of Statistics 2011; Okonkwo 2014). We observed that there are no recycling facilities, though there are waste pickers who mainly pick iron and aluminium waste.

Participants were undergraduate students (18–25 years) recruited through snowball sampling (Noy 2008). The second author visited student campus fellowship centres and outlined the study to individuals who were studying different subjects (e.g., Social Sciences, Natural and Physical Sciences). Students then recruited peers (classmates, student club members, hostel roommates) to the study. This allowed us to involve a sample of students drawn from various departments and faculties. We have used this method of recruitment in previous studies exploring sensitive topics such as transgressive drinking practices (Dumbili & Henderson 2017). We aimed to maximise the opportunities for students to interact comfortably and focus groups were composed of students who already knew each other through being house-mates or socialising together. Three focus group discussions were conducted involving male ($N=12$) and female ($N=6$) students in addition to six interviews (3 females, 3 males). We had organised individual interviews in addition to groups to explore whether participants were inhibited in different settings (e.g., students may be reluctant to divulge their littering practices in a group). As discussed later, students were open about their behaviour and in the group sessions, their stories drew laughter from peers rather than social opprobrium. Research sessions were conducted in English, the 'official' (colonial) language of Nigeria and the medium of instruction at the University. This was on the grounds that English would be most inclusive given that students came from diverse ethnic and linguistic backgrounds. Though some of our students spoke Igbo, the main indigenous language of Eastern Nigeria, others came from Delta and River States (Southern Nigeria) where Igbo was neither spoken nor understood.² We convened groups of male and female students separately as our intention was to maximise participation (in this part of the country there are no specific restrictions on holding mixed research sessions). Ethical approval was obtained from Brunel University London Ethics Committee,³ and research took place during June

2019.⁴ The names of the participants have been replaced with pseudonyms and other identifying markers removed.

Protocol of Research Sessions

In the group sessions and individual interviews, we were keen to allow participants to lead discussions working from a pre-planned but flexible topic guide, probing for more detail or clarification (Carter & Henderson 2005). We probed for specific terms (such as 'microplastics') and noted where concepts were raised spontaneously as opposed to being prompted by the facilitator (e.g. 'responsibility'). Where possible, we traced the origins of people's ideas and asked them to clarify, explain, and unpack their responses. As with other qualitative research, the sample was not intended to systematically represent a population but to pilot data collection techniques and generate new hypotheses. In our group sessions we were particularly interested in 'how' people arrive at social knowledge about plastics and waste through interaction with their peers (Green & Thorogood, 2009). We noted where behaviour seemed to be accepted as 'normal', where comments generated laughter or nods of approval. In individual and group sessions, we were keen to explore people's 'frameworks of understanding', how people give meaning to their social world (Spencer, Ritchie & O'Connor 2007: 215). Our overall aim was to generate rich contextual data that illuminated how students attach meaning to plastic pollution and waste in their everyday lives.⁵

Data Analysis

Audio recordings were transcribed verbatim, and transcripts read several times; they were cross-checked with audio recordings for accuracy.⁶ Having immersed in the data, manual coding was initiated independently by the authors, who marked key passages according to analytical themes. This approach used some of the principles of grounded theory, developing analytical constructs, which were then applied in an iterative manner across the sample allowing us to confirm, reject, or modify concepts. Codes/labels were assigned to the relevant portions of the data (Campbell et al. 2013) and we cross-checked and discussed the first round of codes before reaching consensus on our coding frame (Cascio et al. 2019). This guided the coding of the remainder of the transcripts and we then grouped our data together and refined and named our tentative codes (Braun & Clarke 2019). We searched for themes (e.g., 'blame') as well as specific words (e.g., 'smell'). We have used this approach to explore how diverse audiences attach meaning to health beliefs and practices (Dumbili, 2017; Dumbili & Henderson 2017; Henderson 2008). Deviant cases were sought to explore where participants did not adhere to community norms.

Results

Plastics, Utility, and Modernity

We began our research sessions by asking 'what comes to mind when you hear the word plastic?' Across the groups and interviews, participants swiftly listed different everyday plastic items which they associated with being low cost and easily disposed:

What comes to my mind are just like disposables, things that are easily used and then we can throw them anyhow and you can throw them anytime like... a can of Sprite and like what Eso said, a bottle of Coke, bucket, can, rubbers, disposable plates, and the rest (Mercy, female, FG1).

It's very mobile, it's one of the benefits of plastic in our time (Onyeka, male, FG3).

Plastic was valued for reasons of utility – being 'cheap' and 'the best way of packaging' as well as 'safe for children', avoiding harm from wooden toys, and durable because of the longevity of the material 'you can use it for a very long time'. Interestingly our participants did not mention hygiene or germs specifically in terms of being 'safe' but instead focused on the materiality of plastics as well as saving time and energy. In other words, there were strong associations attached to plastics as convenient particularly in relation to packaging of food to avoid waste, 'Plastic comes to mind as it is something that has been of immense help to man' (Abeo, male, IV3):

[Plastic] has so many benefits, for example it saves energy. I use plastic plates to store food in the fridge. Instead of throwing your food every day, you can just use the plastic buckets to store the food in the fridge like saving time and energy (Ada, female, FG1).

This supports research findings from studies conducted in other African countries such as Mali (Braun & Traore 2015) and Kenya (Otsyina et al. 2018) where convenience and low cost are frequently cited reasons for using plastic as a packaging material (e.g., plastic bags in Ethiopia) (Adane & Muleta 2011).

Interestingly, plastic also appeared to be associated with modernity and progress. One of our female participant's first thoughts about plastic was to envisage life without it. In her view this represented a regressive step to a more primitive time:

If you said you want to take away plastic, maybe I think we go back to the era of the primitive man, because my course tells you that back then, the days of sand and stones, that's what they called it then (Prisca, female, FG1).

Atmospheric Miasmas and Harm to Human Health

It was striking that plastics waste was a visible problem that was witnessed by our participants daily in their local environment. For example, students discussed their associations with plastic waste by immediately describing in vivid detail how plastic littered the roads that they walked down towards the University:

When we're walking down, myself and Emmanuel, along the [University] Road, we can see there are provisions for most of our garbage and waste to be disposed of, we could see that students and the

locals prefer to just dump them in the gutters and by the roadside and you can see the massive heap of these things and it creates a very bad ... it kills the aesthetic quality of the environment and produces a bad smell (Michael, male, FGD 3).

As Michael noted in his account, the student experience was, in their view, shaped not just by the sight of plastics and other waste but also the smell that was emanating from burnt plastic debris and clogged gutters. The waste disposal bins provided by the government do not have sufficient capacity to service the large community of students and locals and are collected intermittently (Dumbili & Henderson 2020). Waste appeared to be associated with unpleasant odours which impacted negatively on the physical environment. Miasmas were thus offered as a consistent explanation for risk to human health and this was an interesting conceptualisation of harm caused by plastics pollution. Miasma theory predates germ theory and the medical model and refers to illness caused by 'corrupt air' or 'pestilential air'. It was accepted well into the 19th century that miasmas resulted from decaying organic material and were the cause of ill health such as small-pox and influenza (Nelson 2008). As one interviewee explained:

if you take the [University] Road, you will see some plastics there and it's not good at all. You see the smell and whatever [...] there are people selling food just near where the plastics are packed ... it all starts smelling and it's not good for us human beings, not good for us (Samuel, male, IV1).

This was a problem that students had witnessed elsewhere in Nigeria. One student described a river near Abia State, 'there are heaps of plastic ...in fact it has been there for years... In fact, if you pass there, the thing is smelling. You can't even breathe passing there.'

It was striking that our study found a strong association between perceptions of plastic waste and odour, although the odour emanates from plastic waste mixing with solid matter such as food waste. Odour pollution is relatively under-researched compared with other forms of pollution but can affect the quality of life and restrict outdoor activity. In the context of Nigeria, open burning (as opposed to recycling) plastic/waste is widely accepted (Abdulwakeel & Bartholdson, 2018; Anyanwu & Adefila 2014; Okedere et al. 2019) and is reportedly common in other African countries and parts of China (Madigele et al. 2017; Otsyina et al. 2018). Controlled waste burning by incinerators can be a necessity to deal with hazardous waste, such as medical waste; however, open, uncontrolled residential burning of waste can create significant public health and environmental hazards (Cogut 2016).

As one of our focus group participants explained:

[Traders] want to clean their environment and they gather [water sachet bags] and some go as far as burning them, the chemicals that come out of the plastics affect people. People inhale them not

knowing what they are taking in... it can cause sickness into the person's system (Onyeka, Male, FG3).

Here Onyeka is referring to local traders who could frequently be observed burning plastic water sachet bags and 'nylon' but burning was also common practice among our students. Indeed, some of our participants mentioned the ease with which plastic burns as being a positive benefit of the material with one student using broken plastics for 'firewood' because 'it burns faster and all that...broken buckets, bottles' (Stephanie, Female, IV4).

Plastic waste mixed with food waste, burning plastic, and blocked drainage channels were familiar sights to our participants. This was reported as particularly problematic in areas around the student lodges and en route to the University (Figures 3 and 4). One of our male students described how plastic waste forms 'a cloud or a log or a blockage' and Rose explained the impact on drainage channels:

All the drainages we have on our [road]sides are blocked by plastics. When you go to the drains, you see bottles of soft drinks, sachet water [bags] and the rest of them, so there are many costs and a whole lot of damages for us (Rose, female, FG1).

Lawrence, an environmental student specifically mentioned the physical environment as playing a role in compounding the problem because the high rainfall, clay soil, and 'sloppy' terrain (a common feature of Eastern Nigeria) encourages erosion, which facilitates the flow of plastics down towards the University



Figure 3: Wastes dumped inside a gutter near the University. Photo: Emmanuel Ezekwe.

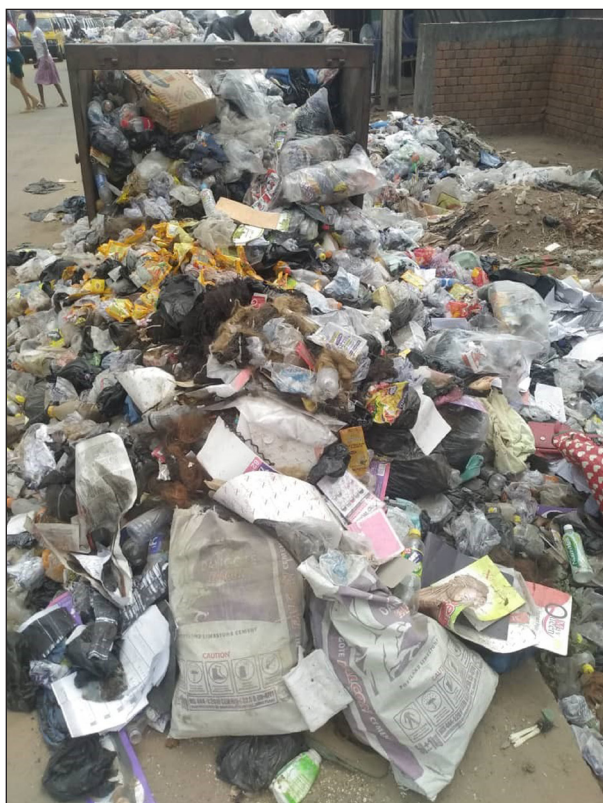


Figure 4: Wastes dumped inside a gutter near the University. Photo: Emmanuel Ezekwe.

Lawrence: The drainages are clogged and the predominant soil here is clay and our town is hilly and it's ...

Samson: Sloppy

Lawrence: Sloppy. So when rain falls... you will see that there is no way for water to pass [through]... drainage system because the plastic has clogged this thing [...]. See, there's a beauty that nature offers us and it gives us peace, warmth, calmness and allows us to relate properly with individuals, but as a result of the pollution of plastic in the environment, it has really disrupted the aesthetic beauty (FGD3).

The lack of drainage attracts unwelcome infestations of insects to the area near their lodge 'it brings mosquitos and all kind of flies and it also means that the water cannot flow' (Daniel, Male, FG2). Plastic waste may be ubiquitous, but students were not inured to its impact, which they saw as having a detrimental effect on the aesthetics of their local environment. The presence of litter was thus associated with a reduction in the perceived restorative quality of a space which other studies have argued is compounded where litter is generated by the general public (Wyles et al. 2016).

Given that the students clearly found the associated odour and sight of plastic waste to impact negatively on their local environment, it was unexpected that most of our participants openly declared their polluting behaviour:

I get a sachet of water and I drink it and I'm sorry to say I just drop it ... you don't even look back, like you just walk on past (Mercy, female, FG1).

Even me here, I'm responsible (laughs)... Even today, I've drank a sachet of water and I've dumped it on one dirt where they are dumping normal... all of us! All of us are... We are all in it together (Okey, male, IV1).

The problem of waste blocking drainage has been well documented and contributes to environmental hazards with associated potential health problems (Sonibare, Adeniran & Bello 2019). Studies in Malaysia (Sakawi et al. 2011) have also identified people's perceptions of waste from landfill and the problem of odour nuisance. As an extension of this, our participants revealed their perception of the risks from inhaling chemicals that may be emitted through burning plastic (**Figure 5**):

You see many lodges, and there are people coming out to burn their plastic; even sometimes in my lodge... so because of the smell... [it can harm us] (Okey, male, IV1).

The perceived risk from miasma was a recurring theme across the sessions, and an additional, related risk was also considered to be chemicals in plastics which could, in their view, cause cancer via seafood and leaching from plastic products:

Plastic is a really toxic material... when it's passed into the stream, the fishes can just eat of them and finally it gets to our own [food chain] and we cook and eat it; we can get cancer from that process (Charles, male, FG2).

Plastics don't digest, just stay and go through [...] in your body and then some day it will cause cancer (Prisca, female, FG1).

Our participants discussed how plastic particles could leach into food, which was also a concern of consumers in Ghana (Omari, Frempong & Arthur 2018), where anxiety was expressed about possible migration or leakage of harmful substances from plastic packages into fast food. In addition to directly witnessing the problem of plastic pollution, students cited international media, particularly popular 'animal channels' on social media as being popular sources of belief about the risks of chemicals from plastics. As Samuel explains:

I was seeing a picture of plastics online... inside a river about how long [plastic] stays there and it said in India now, they have stopped the use of plastics, even in some part of China, because of... the harmful effects to human beings and livestock in the river... Those plastics are made of chemicals ... start spreading around the river and it kills the fishes (Samuel, male, IV1).

Some of our participants were studying science subjects and had attended external speaker lectures on plastic pollution. Many students mentioned becoming aware of the risks of plastic pollution through local and foreign media reports (online and TV channels, e.g., NAT GEO WILD) as well as Facebook and Instagram. Indeed, Instagram was extremely popular with our students who described aspirations of becoming an 'influencer', thus reflecting how African audiences and users are rapidly gaining in importance and are increasingly targeted by global media companies, social media platforms, and mobile phone operators (Willems, 2019).

Plastics and Producers

Given that some participants associated plastics with health risks, we were interested in how these ideas mapped on to the framing of responsibility for plastic pollution. While we might assume that at least some students would point towards plastics manufacturers and producer responsibility, in fact, this was not the case. The plastic industry was perceived as 'only trying to make life simple and easier, so I don't see any reason blaming them'.

Here there were no signs of blame apportioned to industry. In a study exploring UK audiences' engagement with plastic pollution, most people saw industry as bearing a degree of responsibility (Henderson & Green 2020). By contrast, the Nigerian students consistently framed the problem as being with consumers: 'it's us'. In their view, once the plastic product had been produced, responsibility shifted immediately from producer to the 'user':



Figure 5: Burning waste in the city. Photo: Emmanuel Ezekwe.

Blame the users because they're the ones making use of the plastic so now 'we' are in charge of the plastic... [the producers] are producing the plastics ... they are not contributing to the problem ... when not properly disposed of, we are the ones causing the problem (Ada, female IV2).

This was a consistent view expressed across our research sessions. Industry was associated with positive progress, as one male interviewee explained:

Everything a producer does is to help humanity, so water in plastic is so that it will aid, it will help [...]. So producers producing plastics, or plastic around, you can't really blame them for causing this, although it is as a result of their by-product that's why everything is littered, but then their sole aim is to help humanity (Okey, male, IV1).

There was no evidence here of critique regarding the quantity of plastics circulating in Nigeria nor of any problems with producers disposing of plastic waste improperly or of extended producer responsibility. The plastics industry was viewed positively in relation to bringing economic prosperity to communities:

That plastic company gives a lot of jobs to people, so many people get their income from that company [...] that company puts food on a lot of tables (Chizutere, male, IV5).

Public/Private Space and Social Status

In outdoor public spaces, students framed waste disposal as requiring excessive discipline and the carrying of waste was regarded as impractical. Contextual factors regarding the supposed inconvenience and discomfort of waste disposal have been identified in other studies (Shimazu 2018; Vogt & Nunes 2014) and typical comments included, 'I don't have a handbag and I can't put it in my pocket and I can't carry it along' (Charles, male, FG2). However, female students expressed disgust at the idea of waste in their handbag, fearing contamination from this 'dirt'. While this may seem to support Douglas' (2002) idea of waste as 'matter out of place', as Furniss (2017) points out, 'waste is not all just "matter out of place": there exist genuinely different ways of understanding it' (Furniss, 2017: 315). 'Dirt' as our participants more typically described 'waste' may have multiple meanings that are context specific and require further analysis.

In relation to plastic pollution, we found that amongst our participants, dropping plastic bags or packaging indiscriminately appeared to have become socially acceptable to the extent that those who do not do so are marginalised. One of our focus group discussants recounted her discomfort when she was ridiculed publicly for challenging the social norm by not dropping a water sachet bag on the floor of a bus:

...the reaction of people around me, I felt embarrassed, because they were like, 'so now you are

forming a good person? You could not just drop that anywhere? You could not just drop it inside the vehicle so that when the person is cleaning up, they clean it? You had to wait?' I'm like, 'that's the right thing to do', but the whole reaction of people, it got to me (Rose, female, FG1).

Rose chose to dispose of her plastic in a pro-environmental manner, but because this was witnessed publicly, her actions were interpreted by fellow students as 'virtue signalling'. In other words, she was mocked for supposedly showing off her moral superiority. In retelling her story, Rose was clearly discomfited by the memory of the social opprobrium she attracted. By contrast, Lawrence also described a similar bus journey. Unlike Rose who waited until the bus passed a waste bin (and then threw the empty sachet from the bus), Lawrence claimed he was compelled to throw his plastic sachet out the window onto the street:

Immediately I drink it [sachet water] in a bus, I feel uncomfortable to hold the empty sachet; it makes me look probably like a toddler, and I there throw it on the streets; do you understand? (Lawrence, male, FG3).

It is obvious that Lawrence was aware that the environmentally desirable behaviour was to wait and dispose of the litter; however, his response suggests there was more at play than provision of waste bins. By invoking the idea of looking 'like a toddler', he is alluding to his sense of maturity and masculinity. We followed up on this and our student participants explained that amongst their peer groups, holding an empty water sachet publicly to take it to a bin for disposal was perceived as immature and 'not for the grown-ups'. Certainly, some pro-environmental behaviours are gendered (e.g., Swim et al. 2019 found that some men saw bringing a bag with them to a shop would risk being labelled 'unmasculine').

Social practices are likely to connect to ideas of citizenship and ownership of public space in Nigeria. Here we found there were strongly held ideas about public/private. Students discussed their own littering behaviour in University accommodation and assumed it was not their role to clean up as this would disrupt the accepted norms of social organisation:

You just throw it on the floor like that expecting a cleaner to come and pick it up... the cleaner comes to pick everything up (Ngozi, female FG1).

Amongst our participants there was a strong sense that public space or government-owned property is 'no man's business' whereas domestic space is perceived differently:

Some people are just nonchalant; they don't care about their country, Nigeria; they don't care about anything; what they just want is just their selfish interest. Their house is neat, yet the road is untidy... (Ada, female, IV2).

It is possible that given that our participants lived in residential lodges, the students perceive this as a zone outside their control, they do not have ownership and 'dirt' is therefore 'not their business'. Related to this, there was a strong sense of propriety in terms of who was responsible for cleaning the space and this may connect to assumptions about hierarchy and social status (i.e., it is the role of cleaners to manage waste in lodges or buses).

Further research is needed to explore the social meaning of 'drinking and dropping', but it may also be linked to ideas about performative social status with plastic being a visible social marker:

Normally if you buy plastic after drinking it ... to show we can afford something like this...we just tend to drop it there ... sachets of water bag, the bottle, and even the plastic drinks (Abeo, male, IV3).

As an extension of this, one student recalled attending a 'Beat Plastic' lecture at the University where the international speaker suggested that students should bring reusable bags to shops. This attracted laughter and derision among our participants. Several scorned at the notion of bringing their own bag to Roban shop (popular large store). As Onyeka explained, 'based on social status...it helps them to improve their ego..., most people want to show that... nothing is pressing them down [economically]' (Onyeka, male, FG3). Further clarification revealed that a reusable bag could denote that they were struggling financially and carrying a bag without the logo of the shop could be perceived as diminishing their status with their peers. Hawkins, Potter and Race (2015) note in relation to bottled water that brands should be considered as both market and political devices. In similar vein, a study of women in Mali found that younger women used plastic bags and rejected local hand-made baskets (Braun & Traore 2015), thus publicly signalling their modern identity through consumer choices (Nava 2002). In our previous research with young Nigerians, we found that public image was very important to young Nigerians and their consumption of certain brands played an important role in identity formation (Dumbili & Henderson 2017).

Conclusion

In this paper, we have explored how young Nigerians experience waste and plastic pollution in their everyday life, using the tools of qualitative research to shed light on some of the complexities and ambiguities of interacting with plastics waste. As we are relying on the accuracy of self-reported accounts of littering, we cannot verify the possible gaps between expressed and actual behaviour. Viewed through a Western lens, where anti-plastic norms are becoming common amongst young adults and University students are frequently leading campaigns for reductions in single use plastics, it was unexpected to find such casual discussion of students' own polluting behaviour. This requires further research and analysis which accounts for the possibility that publicly dumping and discarding plastic waste can also form acts of resistance, 'externalizing the garbage that they had struggled to manage in the

home' (Fredericks, 2015:138). Our analysis certainly points to the importance of wider overarching socio-cultural issues. These include strongly held ideas about ownership and regulation of 'public spaces', hierarchy, and social organisation, as well as the anticipated and actual stigma related to prosocial behaviours and as such, required broader thought than simple technical interventions.

Our results also subvert findings from studies which have generally found that people deflect responsibility away from themselves – from consumers to politicians and from policy makers to consumers (Braun & Traore 2015). Although there was some criticism expressed towards the government, there was no attempt to shift responsibility. Nigerians reportedly have limited understanding or trust in the government to invest in the reduction or recycling of litter and this may impact on people's sense of collective responsibility (Lucrezi & Digun-Aweto 2020). In addition, it is also possibly an obvious function of the current lack of solid waste management infrastructure which devolves responsibility to individuals for managing their own waste.

Plastic waste was perceived as risky to human health in terms of the sight of plastic waste, blocked gutters, and flooding and feelings of wellbeing. This is not surprising as the blight of waste was a visible daily reality which had resonance for these students living in a city where the tropical climate and increased population, compounds the problem. However, we did not anticipate that miasmas were consistently presented as a recurring explanation for risk to human health. The non-contagionist theory of atmospheric miasmas (poisonous vapours) as being the principal cause of epidemic disease such as cholera has a complex history which folds into the economic and political debates of the time (Carter & Davey Smith 2008: 149). Yet we should not dismiss miasma theory on the grounds of being 'unscientific'. This 'infection of the air' as Liboiron (2013) describes, can be useful for thinking through (micro)plastic pollution. Miasma theory shares several characteristics with the behaviours of plastic chemicals, 'logical models used to explain dispersed, unspecific influences within the wider environment that caused bodily harm and illness' (Liboiron 2013: 134). This point seems particularly salient as microplastics have recently been identified in the atmosphere which means that 'we will inevitably be breathing them, even in remote and apparently unpolluted parts of the world' (Liss 2020). Making sense of plastic waste in terms of miasmas is also valuable in that odour pollution is understudied and can signal other significant environmental problems including air pollution, illegal burning of waste, or excess chemical pollution levels.⁷ In other words, there is no evidence of a public 'deficit' of scientific knowledge here, but instead, we need to better understand knowledge practices that are cognisant of the complexities involved in negotiating and managing everyday health risks (see Hinchcliffe et al. 2017).

A recent work in the UK (Henderson & Green 2020) found that for some more environmentally aware people, the problem of plastic pollution was framed as 'Big Plastic'. There was no evidence of this critique within our study. The plastic industry was viewed positively as contributing

to the economic wellbeing of Nigeria and responsibility for plastic products was considered to end once these had been distributed to consumers. In the context of Nigeria, the perceptions and comportments of individuals have an added political valence because so much responsibility for waste management has been devolved onto the individual, such as the burning of waste (as opposed to its incineration within waste infrastructure as is the case in the UK). This requires further research as studies in other African countries have identified dumping waste as a public act of resistance, highlighting material inequalities of urban infrastructure and 'refusing to be refuse' (Fredericks, 2015: 4).

While it is important to explore social practices and negotiations concerning plastic waste at a local culturally specific level, we also must not lose sight of municipal and national state politics (Fredericks, 2015) nor of the structural power dynamics which shape these encounters (Liboiron 2013). Writing in *Teen Vogue*, Liboiron extended this argument to position plastic pollution as a function of colonialism, critiquing European and North American NGOs and industries for 'pointing the finger at local and Indigenous peoples for 'mismanaging' imported waste, and then gaining access to land to solve their uncivilized approach to waste management' (Liboiron 2018). Given the historical links between the government and Western-owned oil companies, it is possible that young Nigerians' views on industry simply reflect cultural norms and a colonial past. Plastic products were once markers of household social distinction (Hawkins 2006) and our study findings suggest that, for some young Nigerians, plastics are still associated positively with freedom and convenience whereas pro-environmental behaviour is yet to be considered 'normal' or 'cool'.

Notes

- ¹ Our collaboration on plastic pollution began when LH hosted ED at the Institute of Environment, Health and Societies as a Commonwealth Blue Charter Fellow (funded by ACU).
- ² ED understands the Igbo language but speaks English with colleagues because of the diversity in languages and dialects in Nigeria.
- ³ Ethical approval reference 16569-LR-Mar/2019- 18606-1.
- ⁴ Participants gave informed written consent (as per British Sociological Association guidelines). Transcripts were anonymised and data held securely. Participants received a small token of 2000 naira (approximately 5 Euro).
- ⁵ We showed two short news and documentary film clips (A Plastic Ocean 2017) about plastic pollution in research sessions, towards the end to allow for spontaneous discussion and to avoid generating affective responses to the material. LH had used this material with UK focus groups to explore how audiences engage with messages in news versus popular media. See Henderson and Green 2020 for full transcripts of the media content.
- ⁶ We consulted contemporaneous field notes, taken in situ by a local female assistant (noting gestures, laughter).
- ⁷ The D-NOSES project (EU, H2020) uses citizen science to map odour pollution <https://dnoses.eu/about-d-noses/>.

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Competing Interests

The authors have no competing interests to declare.

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