

RESEARCH

A Materially Contextualised Account of Waste Pickers' Marginalisation in Brazil: The Case of 'Rubbish PET'

Tatianna Mello Pereira da Silva

Based on the acknowledgment of the materiality of recyclable materials, and therefore of their condition of actants in the recycling market, this paper proposes a materially contextualised account of waste pickers' marginalisation in Brazil, departing from the extant literature on the topic. Drawing on a mixture of interviews and participant observation data collected during six months of fieldwork using the follow-the-thing approach, it explores the case of 'rubbish PET', (i.e., PET—polyethylene terephthalate) bottles dyed in colours other than green or blue to which there is currently no recycling market. The afterlife journey of discarded PET bottles provides the background for a discussion around the capacity of pigments to assert themselves, endangering and defying human efforts to transform discarded PET bottles into resources again. Through the reactions they elicit from those aiming to control their disruptiveness, pigments come to encapsulate the interests of powerful actors and are then transformed into tokens that transmit and reaffirm their hegemony throughout the PET recycling chain, therefore becoming implicated in political processes that contribute to waste pickers' socioeconomic deprivation.

Keywords: Follow-the-thing; PET bottles; recycling; materiality; waste pickers; empowerment; Brazil

Introduction

It is hard to ignore the ubiquity of plastics. The versatility of this synthetic organic compound derived from petroleum—and also its lightness and cheapness (Hawkins 2009: 185)—enabled the progressive replacement and displacement of other materials, such as wood, metals and glass, in an array of diverse applications throughout the twentieth century (Vincent 2013). Plastics are so deeply ingrained in our lives and daily routines, influencing how we feed, move, communicate, work and rest, that it became commonplace to say we are living in a Plastic Age. Our bodies and environment are living depositories of the archaeological reminiscences of our plasticised life, yet the material recalcitrance of plastics (Bennett 2010) is often relegated to a background passivity, as if plastics were merely objects that epitomise our culture of disposability (Gabrys, Hawkins & Michael 2013).

Ironically, this neglectful account of the materiality of plastics, and of matter in general, is perpetuated by the materialistic lifestyle that prevails in our globalised culture of hyper-consumption. The current linear production and consumption model based on a logic of disposability can only prosper by concealing the vitality of matter (i.e., the manifest and 'curious ability of inanimate things to animate, to act, to produce effects dramatic and subtle' (Bennett 2010: 5–6). The popularity of plastics, therefore,

is fundamentally grounded in the obdurate disavowal of its persistence after single use, i.e. on the suppression of its imminent future as rubbish inscribed in its very plastic materiality (Hawkins 2009).

This study unveils the hidden afterlives of plastics, more specifically of polyethylene terephthalate (PET) bottles, based on a case study carried out in Brazil using the follow-the-thing approach. The exposure of the obscure end-of-life of PET bottles, however, is only instrumental to the underlying purpose of this paper: investigate the role played by the materiality of PET bottles in the organisation of the PET recycling chain through an examination of the case of *PET lixo* or 'rubbish PET', i.e. PET bottles dyed in colours other than green or blue or which are opaque. Pigments added to PET bottles act as contaminants in the recycling process, defying efforts to recycle PET.

Yet more importantly, while writing the biography of PET bottles, I hope to shed light on more obscure aspects of the dynamics of recycling markets (Kopytoff 1986) that may be contributing to perpetuate waste pickers' marginalisation. I am particularly interested in the active participation of PET bottles and pigments in socio-political processes mediating the PET recycling market in Brazil, exploring how their materialities are appropriated by some individuals to the disadvantage of others in a context of power asymmetry. Ultimately, in light of their active capacity to affect other bodies, enhancing or weakening their power (Bennet 2010: 3), PET bottles and pigments are here used as heuristic tools to explore aspects of waste

picker's marginalisation in Brazil that previous studies concerned with the topic failed to address.

The following section sets the scene for the research, examining the approach commonly adopted by researchers who have studied waste pickers socioeconomic situation in Brazil. After identifying a key limitation of their approach, I propose a different research perspective and outline the methodology underpinning my investigation.

Next, I present the theoretical grounds upon which arguments made throughout the text are anchored, briefly engaging with the literature that argues for the importance of accounting for non-humans as agents in the social world and reflecting upon how things, through their materiality, actively participate in the process of becoming resources and, consequently, wastes.

Following, I provide an overview of the PET recycling chain traced in this study, which starts in Brasília, precisely at *Lixão da Estrutural*, one of the five biggest dumpsites of Latin America before its closure in January 2018 (ISWA 2016), and reaches its end point some hundreds of kilometres away at *Química Amparo*, a producer of homecare products based in the state of São Paulo, who uses post-consumer-recycled (PCR) PET pellets in its packaging.

Finally, I empirically examine how the interaction between the materiality of PET bottles and pigments exert pressure over the configuration of the PET recycling chain and I discuss how individuals holding power attempt to appropriate material contingencies to their own benefit. The paper concludes proposing that as bottles and pigments come to encapsulate the interests of certain powerful agents partaking in the recycling chain not only the value and prospects of 'becoming' of bottles is asserted, but also that of the powerless.

Background and methodology

Scholars researching the Brazilian informal waste sector, often affiliated to the social and solidarity economy literature, tend to stress the central—and yet neglected—role waste pickers play in waste management systems, emphasising the importance of their organisation as a group and advocating for their recognition, remuneration and integration into the formal waste economy. Commonly, they foreground the social relations within groups of waste pickers, seeking to encourage and strengthen cooperative work (Mazzarino and Mendes da Silva 2013; Tremblay and Gutberlet 2012; Vaccari, Torretta & Collivignarelli 2012), and between such groups and local authorities trying to facilitate the establishment of partnerships for the provision of waste management services (Gouveia 2012; Gutberlet 2008; Gutberlet 2015; Jacobi and Besen 2011).

These studies were crucial to increase awareness at the policy level as to the need of addressing waste pickers as key stakeholders in waste management systems. It was largely due to their endeavour exposing the harsh living and working conditions of waste pickers, fostering their mobilisation and evincing the valuable yet unpaid public service they provide that the National Solid Waste Policy—Act 12.305/2010—specifically lists 'the integration of waste pickers in actions involving the shared responsibility over a product's lifecycle' as one of its main targets.

The Act further encourages the creation and development of cooperatives and other forms of association for the empowerment of waste pickers and grants financial incentives to local authorities who hire waste pickers' cooperatives to provide waste management services.

Despite their invaluable scientific and political contribution, academic efforts like these disregard 'the contingency and performativity of matter in political processes' (Hawkins 2009: 187) and hence neglect how matter, in this case the very recyclable materials waste pickers reclaim, might concur to (re)produce the group's deprivation and exclusion. As Reno (2015: 561) reminds us, '[a]s with exchange practices, acts of rejection, remaking, and reuse change people and their relations with each other as much as they change the objects themselves.' In other words, one cannot fully grasp the intricacies of socio-political processes that may result in the marginalisation of waste pickers without accounting for the recyclable materials mediating these very processes.

Inspired by authors who have engaged with the materiality of things revealing the social relevance of their afterlives (Crang 2010; Gille 2010; Gregson, Watkins & Calestrani 2010; Gregson et al. 2010; Hawkins 2009; Lepawski and Mather 2011), this paper challenges the epistemological foundations of current research on waste pickers' empowerment. It adopts a comparatively under-represented viewpoint and advances an adjustment of analytical framework informed by the capacity of objects and matter to consolidate and preserve social order, power, scale and hierarchy (Murdoch 1997: 329) (i.e., by their thing-power (Bennett 2010)). In this materially contextualised account of waste pickers' marginalisation, discarded PET bottles take the centre stage and their journey between the loss and regeneration of value (Reno 2009) provides the narrative that guides the investigation, having the recycling market as background.

Drawing on qualitative data collected during six months of fieldwork in Brazil, between August 2016 and February 2017, using a follow-the-thing methodology, I will demonstrate through an analysis of the case of 'rubbish PET', i.e. PET bottles that are opaque or dyed in colours other than green or blue, that as agents attempt to deal with the materiality of pigments contained in some PET bottles, they reveal asymmetries in the power dynamics of the PET recycling market. The most powerful, who can avoid the nuisance of pigments, appropriate their materiality to reaffirm their hegemony. The least empowered, on the other hand, are left to remedy the disruption caused by the presence of such contaminants from their marginal position.

Because the ultimate purpose of the research is to reflect on the socio-political implications of the materiality of PET bottles for waste pickers, it seemed appropriate to have the moment when waste pickers reclaim bottles as the starting point of the investigation. The research progressed along the recycling chain tracing PET bottles using a chain-referral method and a mixture of interviews and participant observation. It culminates with the revaluation and repurposing of PET into a final product ready to re-enter the consumer market and start a new cycle.

The choice of end point by no means implies that the materiality of PET ceases to bear consequences to waste pickers as PET gains new shape and moves along the chain into the consumer market. It only indicates that, beyond that point, reasons for such relationships become variegated and not as straightforward as in the recycling market. Proceeding to make such an inquiry would require an analysis of consumer behaviour towards packaging to then evaluate its connection with waste pickers' marginalisation, which implies more time for fieldwork and rethinking the methodological framework of the research in a way that was not possible in the context of this study. For similar reasons, actors who do not directly take part in the PET recycling chain, such as the government, the media, NGOs and academia, were not included in the investigation.

A materially contextualised account

As Zimmerman *apud* Bridge (2009: 1220) argues, '[r]esources are not: they become.' The process of becoming a resource is fundamentally a process of abstraction (i.e., of homogenisation and standardisation on both material and conceptual levels aiming at its fungibility in local and global markets (Richardson and Weszkalnys 2014)). Recycling is nothing but an abstraction process that results from an entanglement between 'bodies, technologies, infrastructures, and substances' whereby 'elements are drawn into the assemblage, and others expelled' (Richardson and Weszkalnys 2014: 15–20).

As much as humans try to control these entanglements, some elements might resist entering or leaving the assemblage that underpins the abstraction process of PET recycling, hence defying the becoming of PET as a resource again. Such is the case with pigments, whose 'stubbornness or inertial tendency to persist' (Bennett 2010: 22), as shall be demonstrated in the following subsection, disrupt the PET recycling process affecting its recyclability; hence, their designation as contaminants in this paper.

Things, such as PET bottles and pigments, are more than unavoidably passive objects manipulated by uniquely active subjects. They are active parties (actants) in the making of the social world (Latour 1996; Latour 2005; Rudy and Gareau 2005; Tilley 2007). Despite the prevailing anthropocentric claims of political theory, still largely fixated with intentionality (Braun and Whatmore 2010; Hawkins 2009; Hawkins 2013), things are not mere expressions of 'human meanings, designs, or purposes' (Bennett 2010: 20), i.e. they not only have the capacity to be affected, but they too can affect other bodies, both human and nonhuman.

Based on the hybrid relationship resulting from the enmeshment between human and nonhuman entities, Hartmann (2012) affirms the importance of considering what he, citing Margaret Fitzsimmons, refers to as the 'metabolism of solid waste,' where metabolism stands for the relationship of mutual implication between society and nature. The concept of materiality, backbone of the analysis undertaken in this paper, speaks precisely of the social significance of disposed PET bottles as implicated in social acts. It represents the rupture with the ontology

conventionally used in the social and political sciences that equates agency with self-consciousness, cognition or rationality (Coole 2013: 453–454). Materiality signals a 'new holistic concern with the understanding of the meaningful relationship between persons and things' (Tilley 2007: 19) and with the modes in which material affordances constrain human behaviour along certain possibilities (Urry 2000) as we shall see next in the context of the PET recycling market in Brazil.

An overview of the PET recycling chain under examination

Lixão da Estrutural, closed since January 2018, used to be one of the five biggest dumpsites of Latin America (ISWA 2016). Located in Brasília, capital of Brazil, it was the working place for close to 1,800 waste pickers who toiled, rummaging through waste searching for recyclables to make a living (INESC 2016). Customarily, waste pickers at *Lixão da Estrutural* specialised in reclaiming one of the two most abundant recyclables found in the dumpsite (i.e., plastics or cardboard). Plastics are usually stored in super sacks, mixed by polymer type (e.g., PET, HDPE, LDPE, PP, PS, PVC) and colour, and traded daily—by the end of their working day, before they return home—to middlemen operating in the dump. Waste pickers reclaim 2 to 4 super sacks of recyclables per day, each containing around 40kg to 50kg of materials. Middlemen buy recyclables by the sack and sell them by weight to local buyers usually once a day or every two days. Buyers collect materials at the dump using lorries and calculate the total due by weighing the lorry before and after loading using the road scale at the dumpsite entrance.

Recicle a Vida, a cooperative of waste sorters based 13km away from *Lixão da Estrutural*, is one such buyer. Members of *Recicle a Vida* refer to themselves as *catadores*, conventionally translated to English as 'waste pickers.' However, given that they are not involved in picking waste, only in sorting and baling recyclables, they are here designated 'waste sorters' to avoid confusion. *Recicle a Vida* buys co-mingled plastics from middlemen at *Lixão da Estrutural* and transports materials to its shed using a cage truck. There, its members sort plastics by polymer type and colour using a conveyor belt and bale them using four vertical presses. PET corresponds to 50% of the weight of recyclables *Recicle a Vida* trades per month.

The cooperative usually sells PET to *Brasil Limpo*, a wholesaler of reclaimed plastics with business in 13 Brazilian states. Amongst *Brasil Limpo's* top PET trading partners is *M&G Fibras*, a recycling company with an industrial plant in Poços de Caldas, in the state of Minas Gerais, which is part of the multinational group Mossi Ghisolfi, a leading name in the PET sector. *Brasil Limpo* only intermediates the transaction; PET bottles are shipped straight from *Recicle a Vida's* shed to *M&G Fibras'* plant in a 750km road journey.

Using expensive imported machinery, *M&G Fibras* washes and de-labels bottles to produce flakes. These are then transformed into polyester fibre, for application mostly in the textile industry, or into PCR-PET pellets, used mostly to produce packaging. Although pellets produced

by *M&G Fibras*, and in fact by most of the big recyclers in Brazil, are food-grade (i.e., can be used in packaging in direct contact with foodstuff), the food and beverage industry is not a big consumer of PCR-PET. It is mostly used by the personal and home care industries. *Química Amparo*, a chemical company that operates in the home care segment in Brazil, for instance, buys PCR-PET pellets from *M&G Fibras* to produce packaging for washing liquid and concentrated detergent.

Flowchart 1 below provides an overview of the PET recycling chain followed in this research.

Not all PET bottles flow through the recycling chain, though. As I shall demonstrate next, pigments have the power to affect the recyclability of PET, obstructing the flow of bottles dyed in certain colours. Through the reactions they evoke from agents at different stages of the recycling chain, pigments become implicated in socio-political processes in the recycling market. Because not all parties to the recycling chain have the same power to react to their materiality, pigments overburden the least empowered (i.e., waste pickers), contributing to their marginalisation in Brazil.

The obtrusive force of pigments

After spending a couple of days at *Recicle a Vida* in the early stages of fieldwork, I became puzzled by piles of super sacks and bales of PET bottles of assorted colour sitting indefinitely in its backyard (see **Figures 1** and **2**), whilst colour-sorted monochromatic bales of clear, green and blue PET were put in its front yard and traded nearly every week. I was told there was no market for what they called *PET lixo* or 'rubbish PET', i.e. PET bottles that are not clear or are dyed in colours other than green or blue. As of September 2016, *Recicle a Vida* had accumulated 38 tonnes of 'rubbish PET,' which equates to roughly twice the weight of PET the cooperative trades monthly.

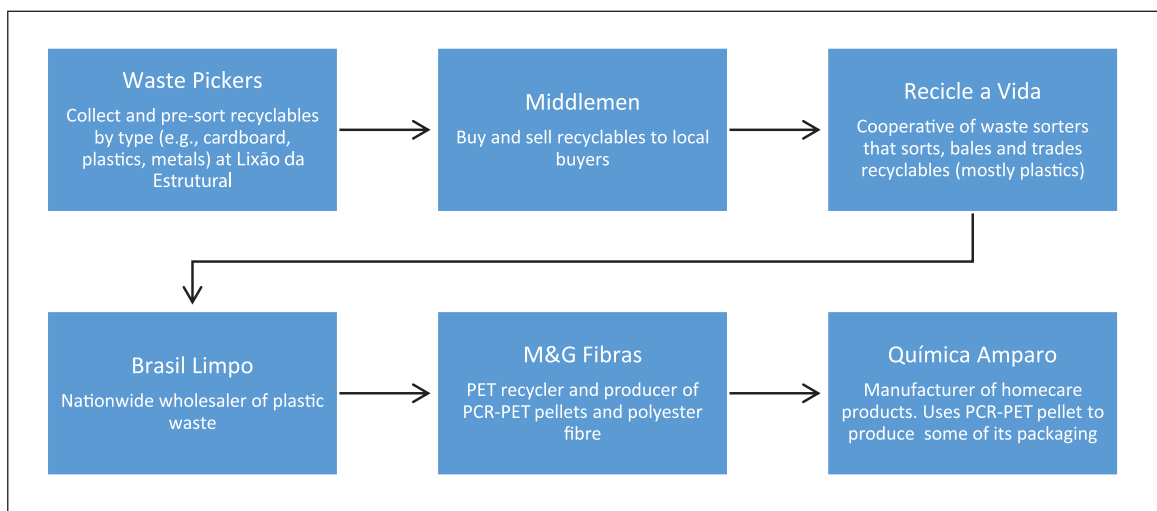
Generally, recycling companies only purchase clear, green or blue PET bottles, preference given to the first. The market attractiveness of clear bottles accrues from the

fact that they have no pigments, hence PCR-PET pellets made from them can be dyed in any colour. Bottles dyed in shades outside this trichromatic spectrum have no market. The reason for such colour restriction is not so much associated with the kind of pigment used, i.e. to its chemical composition and inherent characteristics, as it is to the available volume of bottles of different colours in the market. While clear, green and blue bottles are abundant, bottles dyed in other colours are comparatively scarce.

Although technically possible, it is financially impractical to remove pigments added to PET bottles. These additives make their presence felt visually in the recycling process by tampering the colour of PCR-PET pellets and recycled polyester fibre. Holders of the capacity to determine a key attribute of products made from recycled PET, hence affecting their marketability, pigments are an element of major concern and challenge reactions from agents throughout the PET recycling chain aimed at containing its potentiality to disturb.

To neutralize the obtrusive force of pigments, *M&G Fibras* made massive investments to acquire state of the art machinery that uses optical sensors and compressed air to colour sort bottles, discarding those whose pigmentation is not the one it was programmed to process. If the recycling line is to run at optimal speed, however, sensors are only able to carry out a refinement, i.e. bottles should be colour-sorted before being processed, so that sensors pick only the odd intruder. That is why, as a rule, large recyclers like *M&G Fibras*, with an operational capacity to produce 10,000 tonnes/year of PCR-PET pellets and 7,000 tonnes/year of recycled polyester fibre, only buy colour-sorted bales of PET bottles.

Given that the PET recycling market in Brazil operates as an oligopsony, i.e. as a buyer-driven market where there are only a handful of large recycling companies, buyers are in a position to exert a great deal of control over sellers and impose conditions of trade. Because recycling companies compete in a number of market segments with producers of virgin PET, they have to be strict in their control of pigments; otherwise, the quality and value of



Flowchart 1: The PET recycling chain under analysis.

Source: Author's own elaboration.



Figure 1: Torn sack of 'rubbish PET' at Recicle a Vida.
Source: Photographed by the author in 2016.



Figure 2: Bale of 'rubbish PET' at Recicle a Vida.
Source: Photographed by the author in 2016.

their product can be severely impaired undermining its competitiveness.

Carnavalesque bales, as recyclers commonly refer to bales of assorted coloured PET bottles, are not usually traded and, in fact, are rarely ever tradable in this market. Accordingly, to be able to sell to big recycling companies,

suppliers need to have a reasonably sized shed to carry out colour sorting and, yet more importantly, to build a substantive stock of bottles of the same colour. With a processing capacity in the order of thousands of tonnes, big recyclers have little interest in negotiating loads of single-digit tonnage.

This is not so much an issue for wholesalers like *Brasil Limpo*, specialised in trading plastics, but players at the bottom of the recycling chain, like waste pickers at *Lixão da Estrutural* and sorters like *Recicle a Vida*, often deal with multiple recyclables (e.g., paper, cardboard, plastics—PET, HDPE, PP) and metals. Sorting and stocking materials not only by type but also by colour encumber them and can be spatially prohibitive. Waste pickers at *Lixão da Estrutural*, for instance, lack the necessary infrastructure to stock materials and are compelled to trade on a daily basis. This quick turnaround makes colour sorting unattractive, if not impossible. Pigments, therefore, place waste pickers and sorters at a crossroads given that they either have to make arrangements to sort and stock bottles by colour in order to trade directly with recycling companies—if they manage to secure the means to do so—or they have to rely on wholesalers to deal with the materiality of PET bottles, in which case they remain limited in their choice of trading partners. The situation is further aggravated by the payment policy usually enforced by recycling companies.

To make sure that suppliers adhere to its procurement requirements, it is common practice among big PET recyclers, like *M&G Fibras*, to pay suppliers four days after delivery. By deferring payment, recycling companies have enough time to process supply, checking if bottles were adequately colour-sorted and assessing the amount of contaminants it contains. If standards are not met, price discounts can be unilaterally applied. Suppliers who consistently fail to conform to procurement policies can be suspended or even cut off as trading partners.

Nonetheless, waste pickers and sorters do not usually have access to savings; they live from day to day. In the words of one of my informants, 'We sell lunch to buy dinner.' Waiting four days to be paid is just unrealistic for them. Consequently, they are bound to sell to wholesalers like *Brasil Limpo*, who pay upfront and have working capital to cushion deferred payment, and therefore benefit from the payment policy of big recyclers. The capacity of pigments to undermine the value of PET therefore greatly contributes to the maintenance and reproduction of the current social configuration of the recycling chain.

The efficacy of the deferred payment policy is, however, questionable given that its side effects reverberate in *M&G Fibras* itself compromising its commitment to ensure traceability in the supply chain and reduce contamination. The more intermediaries there are in the value chain, the less *M&G Fibras* is able to manage its supply sources and, consequently, minimise contamination, hence evincing the internal inconsistency of the policy. Keen on trading directly with cooperatives of waste pickers, *M&G Fibras* is working around the limitations of its policy, trying to find a middle ground to secure traceability and quality.

Such procurement requirement and deferred payment policies enforced by recyclers are not properly *actions*, understood as the original cause within a chain of events, but are actually *reactions* to the thingness of pigments. In other words, through their intentionality, human agents partaking in the PET recycling chain attempt to contain the disturbance caused by pigments, but this only happens because of the dynamic capacity of pigments to

intervene in the world in the first place and, more specifically, to literally leave their marks in the PET recycling process. The reactions triggered by the immanent power of pigments, however, leave their own impression in the PET recycling chain, for not all players in the recycling market are on equal footing.

The recent global trend observable in the packaging industry, mainly in the dairy, home and personal care sectors, to progressively switch from high density polyethylene (HDPE) to PET helps to explain how the 'rubbish PET' problem emerged. Until very recently, PET packaging in Brazil came exclusively in three colours: clear (high-end soft drinks, such as Coca-Cola and Pepsi), green (regional soft drinks) and blue (water bottles). The last couple of years, however, witnessed the entrance in the packaging market of PET bottles coming on a variety of shades outside of the dominant trichromatic spectrum. Albeit not having a recycling market due to their colour—hence their designation as 'rubbish PET'—red bottles of ketchup, yellow bottles of mustard and white-opaque bottles of milk, previously made of HDPE, are now being produced with PET.

Interviewed in the course of fieldwork, Hermes, communication manager at *ABIPET*, the Brazilian Association of the PET Industry, attributes this migration trend to the unique characteristics of PET that make it comparatively more advantageous for packaging liquids. Arguably, PET has the best touch-feel, is the most transparent and brilliant and is the easiest to shape amongst the thermoplastic resins used for packaging; therefore, it is very appealing for marketing purposes. In addition, PET offers a strong mechanic and chemical resistance (i.e., barrier properties that prevent leakage and contamination), hence why the soft drinks, water and cooking oil segments are currently dominated by PET packaging.

A member of staff at the Packaging Development Unit of *Química Amparo* speculates about other possible explanations for the switch to PET. According to him, PCR-PET pellets are odourless, while PCR-HDPE pellets retain the odour of substances that came into contact with it. Therefore, companies willing to use PCR resin in their packaging have an inclination to use PET. He further claims it is easier to control for quality in the PET bottle manufacturing process in comparison to the HDPE process.

Price is of course also an important factor motivating the switch. According to Hermes, the existence of a strongly consolidated PET industry in Brazil with a productive capacity of around one million tonnes/year of virgin PET pellets, not to mention the sizeable mills in the US and Asia, means that 'a lot of PET pellet is being offered in the market what naturally drives prices down. Supply and demand. (...) This along with the other factors I have mentioned, make PET unbeatable.' In addition to being overall cheaper than HDPE, PET resin delivers further savings as bottles can be made with less material per unit. When *Química Amparo* used HDPE to produce flasks for washing liquid, for instance, it spent 17.5g of resin per bottle. After having switched to PET, it uses only 13g of resin per bottle: a 25% reduction.

These benefits, all of which were certainly taken into account by producers when deciding to switch from HDPE to PET packaging, are but expressions of its 'vibrant materiality' (Bennett 2010). What producers did not factor in, though, is that pigments are endowed with a similar immanence that encumbers the PET recycling process, restricting the range of embodied actions afforded by PET, despite the fact that 'the "afterlives" of industrially produced objects are the longest part of their lives' (Liboiron 2016: 103). Producers ignore that exchanges between the so-called social and material realms flow in both directions (Murdoch 1997: 334), creating a relationship of mutual contingency. Just as they were able to give new meanings and develop new applications for PET using pigments, the latter are now shaping subjects' roles and functions in the network of social-material relations that constitutes the PET recycling chain (Richardson and Weszkalnys 2014; Urry 2000).

As mentioned before, it is impractical for players at the bottom of the recycling chain, especially for the smaller and poorer, to have dedicated sorting streams for every and each colour outside the conventional spectrum. Doing so would require a considerable amount of time and space, two things least powerful actors can barely spare. Hence, it is not uncommon for waste pickers to bale PET bottles of assorted colour together or simply dispose of the so-called 'rubbish PET,' throwing them back into *Lixão da Estrutural*, therefore creating a vicious and inefficient cycle with coloured bottles re-entering the recycling stream and contributing to reduce the competitiveness of PCR-PET against virgin PET.

Hermes argues that it is precisely because waste pickers' cooperatives are failing to sort bottles correctly that they cannot find a market for it, triggering a fruitless chicken-egg dilemma that departs from the premise that waste pickers should be the ones dealing with the materiality of pigments. He recognises, however, that the fact that newly introduced colours are only available in relatively small quantities overburdens waste pickers. In any case, he maintains that this problem could be overcome if waste pickers were able to better collaborate among themselves, combining their stocks to have enough material to sell in the recycling market, placing on waste pickers the responsibility to remedy the disruption caused by pigments.

Cleusimar, director of *Recicle a Vida*, offers a diametrically opposite perspective to Hermes. According to him, the phenomenon of 'rubbish PET' is the result of 'negligence on the part of producers that care only for economic and possibly aesthetic aspects when designing packaging' and that 'without any consideration for the environment, for society or for waste pickers put a type of packaging in the market that, despite recyclable, has no commercial value; hence why we are calling it "rubbish PET."' Cleusimar ponders that the cooperative has tried to negotiate its stock of assorted colour PET bottles with buyers in all corners of the country without success. Having lost hope of finding a buyer for them, he said they were left with no alternative but to recently start dumping 'rubbish PET' at *Lixão da Estrutural*.

Joint sales could indeed prove to be an interesting strategy to solve many of the logistical challenges of recycling coloured PET, as suggested by Hermes, besides being a robust tool to leverage waste pickers' position in the value chain, increasing their bargaining power. Nonetheless, waste pickers should not be expected to solve a problem that producers created whilst the latter conveniently neglect the afterlife consequences of their design choices. Furthermore, as Hermes himself acknowledges, the industry is yet to develop applications for PCR-PET coming in colours outside the until-very-recently trichromatic PET recycling market. Hence, improving logistics and marketing strategies in this case is of little or no use to waste pickers given that the market for coloured PET is still incipient. In other words, even if they work around the vitality of pigments, there is no guarantee waste pickers will not be hit hard by their rebound force.

Conclusion

The capacity of pigments to assert themselves, endangering and defying human efforts to transform discarded PET bottles into resource again, hence 'captur[ing] humans as much as humans like to think they have the world of things under control' (Hawkins 2009: 188), challenges *reactions* on the part of the agents they *act* upon. Nonetheless, society is not a homogeneous entity; interests are plural and can be competing. Reactions to the thingness of pigments will therefore depend on the agent's capacity to impose his/her interests (i.e., on the power he/she holds *vis-à-vis* other agents partaking in the PET recycling chain.

As Bridge (2009: 1221) notes, resources, and ergo waste, "become" only through the triumph of one imaginary over others,' and usually individuals with the power to capture material contingencies to their benefit, determining how ordering and resource mobilisation will take place, are rarely ever the ones who have a subsistence relationship to a resource. Producers of consumer goods want to harness the marketing potential brought about by PET and attract customers' attention with colourful packaging without considering the vitality of pigments and its implications for PET recycling. As it stands, due to technology and market constraints, PET recycling companies in Brazil commonly do not purchase bottles dyed in colours other than clear, green and blue, therefore evading the obtrusiveness of pigments.

As such, pigments impinge on waste pickers more than extra work and the need to organise their activities around their materiality. Through the reactions they elicit from those aiming to control their disruptiveness, pigments come to encapsulate the interests of powerful actors and are then transformed into tokens that transmit and reaffirm their hegemony throughout the PET recycling chain, what is only possible because of their agentic capacity to begin with. Whilst others manoeuvre around the material recalcitrance of pigments, waste pickers do not have much choice but to confront it, despite lacking the resources to do so. Without the means to resist, they bear the burden without being properly rewarded, therefore becoming victims of the free riding perpetrated by powerful links of the production and recycling chains.

The combination of the thingness of pigments with the reactions they evoke from downstream agents therefore adversely affects waste pickers' position in the recycling chain, contributing to perpetuate their marginalisation.

Solutions are drawn in response to how problems are defined; 'the representation of a problem forecloses some forms of action while allowing others to make sense' (Liboiron 2016: 88). By shedding light over the materiality of bottles and pigments, the latter as an element actively interfering in the configuration of the PET recycling chain and hence influencing waste pickers' position in it, this paper challenges the current representation of the problem of their marginalisation. In so doing, it hopes to contribute to opening up new forms of actions previously unthought. If 'we take society as a complex assemblage of human and nonhuman actors (...) then the question of political or social change becomes a question of changing our relations not only to other humans but to nonhumans as well' (Grusin 2015: xviii).

Acknowledgements

This work was supported by the Leverhulme Trust through a doctoral scholarship.

Competing Interests

The author has no competing interests to declare.

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How to cite this article: Pereira da Silva, TM. 2019. A Materially Contextualised Account of Waste Pickers' Marginalisation in Brazil: The Case of 'Rubbish PET'. *Worldwide Waste: Journal of Interdisciplinary Studies*, 2(1): 8, 1–9. DOI: <https://doi.org/10.5334/wwwj.26>

Submitted: 20 December 2018

Accepted: 25 February 2019

Published: 13 June 2019

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