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Abstract: As Mary Douglas famously put it, 'where there is dirt there is system' (1991 (1966): 35). She was concerned particularly with the cultural systems that determine the ideas about dirt that motivate and constrain people's actions with material objects. This paper assumes that such motivations and constraints may affect consumers' willingness to keep or to dispose of their possessions, and therefore have an impact on product longevity. It reports on ongoing empirical research using product analysis, ethnographic interviews, a questionnaire and student design work into the possibility of increasing the longevity of vacuum cleaners by design interventions.

Because its object of study is a cleaning product used in everyday cleaning practices, the research naturally connects with Douglas' ideas as well as more recent work such as Dant 2003 that focuses on how people deal practically with the materiality of dirt, not determined by cultural categories. This paper builds on Vaussard et al.'s (2014) classification of individuals by their degree of concern for keeping their house clean, into 'Spartan', 'Minimalistic', 'Caring' and 'Committed' cleaners and their implications for vacuum cleaner replacement. Introducing a short history of concern about dirt since germ theory, it considers whether the desire for a more up to date/ efficient/ powerful/ good looking/ clean/ shiny machine may accelerate replacement. It finally considers whether a design that 'ages gracefully' might have a longer life-span, either as a personal possession or as part of a service system.

Introduction

This paper is about dirt, which is not a simple matter. Dirt is both 'stuff' and value. It is physical stuff which has certain properties, some of which may directly disgust us, but it is also stuff we may not like because of what we think about it. The paper explores some of this complexity through a body of research about vacuum cleaners co-funded by Defra and WRAP. Through questionnaire, interview, focus groups and consumer workshops, this research has explored the potential to reduce the throughput of embodied energy that results from the consumption of vacuum cleaners by increasing their life-span. It has used a human centered approach (Giacomin 2014) to work out how design interventions could result in people keeping their vacuum cleaners for longer. Among the research questions were whether and how the physical ageing of vacuum cleaners may stimulate their replacement. The research has shown that the particular ways vacuum cleaners themselves get dirty,

damaged and marked shows that 'dirt' both as a cultural category and as physical matter is implicated in their replacement.

If dirt is implicated in replacement, it is one of a set of powerful pressures on consumers' decisions to replace their vacuum cleaner. These result in a gap between the machines actual lifespan and their possible lifespan. From 2009 to 2012, 44% of UK households bought a vacuum, making it the second most frequently bought domestic appliance (Intel 2013). Half of the machines purchased in 2012 were replacing an existing product under 5 years old, but they are expected to last for longer (WRAP 2013), from 5 to 7 years (Brook Lyndhurst, 2011).

The paper first considers some ways of thinking about dirt, from social science and design history, then reviews some of the results from the research. This indicates that dirt is certainly an operative cultural category for all types of

users, as well as having physical properties that must be dealt with. The differences between users' approaches to cleaning are important in their decisions to replace a vacuum cleaner as is the nature of the dirt involved, and shared ideas about how to deal with it.

Ideas about dirt in practice

In the practice of home cleaning dirt is a focus of complex overlapping and sometimes contradictory concerns that have both material and non-material components. For example, the presence of dirt may be understood as a danger to health, as well as a mark of social incompetence and low status. The dust we can vacuum up may stimulate a feeling of duty to eradicate it as well as being real stuff that sticks to skin and to the surfaces of objects, clouds the air and gets up the nose.

This reflects the complexity present in theoretical approaches to dirt. It can seem that the physical matter in question is less important than the social/ cultural system that marks it out as dangerous. This very influential position developed by Mary Douglas in her *Purity and Danger* (1991 (1966)) was subjected to a critique more recently by theorists concerned to put the 'material' back into her account of material pollution. Dant and Bowles' 2003 account of mechanics dealing with the dirt they encounter every day represents a newer approach to dirt that has emerged from the so-called 'material turn' in the humanities and social sciences (see for instance Pierides and Woodman 2012).

The discovery of the relationship between bacteria and disease in the C19 by Pasteur and others (Worboys 2000), led by the end of that century to a strong association between dust and disease. The physicist John Tyndall first proposed this association (1870). Finding a way to produce a container full of dust-free air to experiment with light, he noticed he had also produced an environment in which organic matter did not rot. This association between dust and disease brought new pressures to bear on the duties involved in dealing with dirt in households and in cities. Alongside its effect on physical hygiene, it changed what we think about dirt and as a result affected what we think we should do about it. The design of cities to provide supplies of uncontaminated water was one outcome. Efforts by the 'sanitary reform' movement to control a wide range of health

hazards including 'fly-tips, abattoirs and industrial hazards' were another (Worboys 2000, p. 26), alongside the design of systems to deal with waste and keep streets clean (Rogers 2005).

Beyond these practical steps, the connection between dirt and disease produced a strong moral frame for action. As Forty describes (1986, p. 159ff), mixed with class prejudice this soon exceeded its origin in the scientific understanding of disease transmission and all dirt came to be classed as morally damning. As he puts it (ibid, p. 168), '...hygienists turned increasingly to methods that exploited guilt. However, before guilt could be brought into play, cleanliness had to be transformed from a physical problem to a moral one.' Consequently, hygiene campaigners became focused on the individual conduct that could prevent dirty bodies and dirty houses.

The aspect of Forty's historical narrative that is most relevant here is the observation that health campaigns were relatively ineffective in characterizing dirt as the origin of ill-health compared to consumer product design and advertising. By the middle third of the twentieth century, achieving hygiene by battling dirt underlay campaigns to sell products ranging from domestic and office furniture to bathrooms. And of course, since they were invented to directly combat disease-carrying dust, vacuum cleaners are a prime example of this proselytizing through design.

Forty identifies the ways designers of furniture and architecture responded to the growing association between dirt and disease – these included furniture that had no carving or mouldings, as well as a preference for fused, hard materials that would not absorb muck. He suggests that the modernist preference for chrome and glass derived not only from their 'association with machines', but also because they could be kept looking clean. Progressive modernist designs therefore intertwined the abstract rhetoric of hygiene with the actuality of performance – these were designs that both looked clean and were clean. As he puts it:

"The history of the vacuum cleaner is a good example of the commercial applications of the phobia against dirt, and of the way appearance and styling were affected by the imagery of hygiene" (ibid, p. 174).

This potent combination of moral and material became by the early C20 something that individuals displayed through their possessions and continues to be. Just as early in the twentieth century, the possession of a bathroom indicated a 'good' family, owning a vacuum cleaner meant an ordered hygienic household – measuring up to the moral imperative to battle dirt as a crucial aspect of responsible housekeeping.

Contemporary dirt

Forty infers these connections between designs and the moral imperative of hygiene from the social milieu in which the designs appeared and reads them out of the form of the designs themselves. The research on which this paper draws has shown the progressive futurism that Forty saw in the design of vacuum cleaners, and the theme of social 'face' that he associates with the social role of vacuum cleaners, still to be at work. However, its direct engagement with consumers means it is able to see these themes at a finer level of granularity and to bring out their relationship to product longevity.

As one of the focus group participants said of the dust that his vacuum cleaner collects, 'you don't know what it's doing to you'. He was not alone in expressing his concern about the effects of the special sort of dirt that we vacuum up. Taking a cue from Dant's focus on the material properties of the dirt, against the cultural systems that define it, it is worth considering some of the special qualities of the dirt that swirls round the canister of a bagless vacuum. Dant refers to the Sartre's description of slimy substances in *Being and Nothingness* (1984) to focus on bodily responses to dirt. Whereas Dant's concern is for dirt that is actually slimy, dust is not; however, it is made of particles that are small enough to work together as a fluid, losing their identity as discrete identifiable elements. Like slimy substances dust attaches itself to the skin and to surfaces and stays there – it won't run off. But it doesn't 'pull' like slimy stuff; it isn't tacky. Indeed, it is similar to some dry substances made of tiny particles that may be pleasant to touch, like dry sand or flour, but unlike those substances, we don't really know what dust is made of. The nearer things come to the mouth, the more salient they are to us, and the keener

is our evaluation of them (Fisher 2004). Dust sticks to us, it flies about and we may breathe it in, not sure it doesn't carry pathogens or be otherwise harmful.¹

Alongside the dirt accumulating in the vacuum that we have to deal with when emptying the canister, changing the bag, cleaning filters, unblocking the tubes or removing trapped hair or other items, vacuum cleaners themselves get dirty as they are used – dust sticks to their plastic surfaces. This loss of physical 'gloss' with age is only partly responsible for the object looking used. Styling obsolescence also plays a part in this and Forty notes that as early as the 1930s, vacuum cleaner manufacturers were following the lead of the automobile industry and introducing changes to the appearance of their designs to stimulate sales by using appropriately progressive, futuristic motifs. The constant arrival of new models means a vacuum cleaner is likely to begin to look dated at the same time as it becomes dirty – losing its physical 'gloss' and its aesthetic appeal. Following Douglas it is possible to class this aesthetic ageing, alongside the moral frame described above and the physical contamination involved in vacuuming, as different components of 'dirtying':

"With us, pollution is a matter of aesthetics, hygiene or etiquette, which only becomes grave in so far as it may create social embarrassment" (1991, p. 73).

Types of dirt, types of cleaners and disposal

The practice of vacuum cleaning is structured round the ideas discussed above, which play out through the orientations that individuals have to the activity of cleaning. Vaussard et al. (2014) identified four 'types' of cleaner, for whom dirt and cleaning have different level of salience, and who clean their houses more or less frequently. These types, and their frequency in the population studied here, are as follows:

1. Spartan cleaners (12%)
2. Minimal cleaners (34%)
3. Caring cleaners (40%)
4. Committed cleaners (10%).

¹ We might enjoy manipulating flour in cooking, but be less able to if we are not sure it doesn't contain weevils. We might enjoy the feeling of sand on our skin at the beach less if we think too hard about the people who walk their

dogs there. These thoughts are the equivalent of the cultural knowledge that Dant identifies as overlaying the phenomenal presence of dust and dirt.

The four types differ in the importance they place on cleaning their home – they consequently have different relationships to the moral frame outlined above. So it should be possible to see within the orientation of these types to cleaning practices, and vacuum cleaners, more and less positive views of that moral frame.

Our empirical work revealed that there are other matters that affect individuals' relationship to vacuuming, which are closer to the materials involved than to the moral systems and seem therefore more likely to be explained by Dant's (and Douglas's) reading of Sartre's passage on sliminess and stickiness.

Some participants, for instance, seemed to reject the moral dimension of a concern for cleaning. These members of the 'spartan' cleaner type seemed to be at a particular (early) life stage and to take an entirely instrumental approach to their vacuum cleaner, its use and its replacement. For this group, the machine is simply a servant, a piece of necessary equipment that does not deserve much care - they are not concerned for its appearance. In contrast, for individuals at the other end of the spectrum in the 'committed' group, the appearance of the cleaner, and its visibility, are very important. A case in point was a family vacuuming several times a day, storing the machine in sight in the hallway. The rationale was that their child-minding business required them to demonstrate the cleanliness of their home and their commitment to it - the moral dimension of cleaning was to the fore as part of their public face.

However, there was little evidence for a desire to get a new vacuum cleaner because the old one no longer looks good, though this varies with cleaner type. Some 'committed' cleaners said their scuffed current machine was looking 'used' and one expressed a desire for something 'new and shiny'.

'Spartans' notice dirt but do little about it - cleaning is not of great importance to them and they may vacuum only once every two months. 'Minimalists' feel a little uncomfortable noticing dirt around the house and have some motivation to clean but it is not a priority and only done when they have time. 'Carers' want a clean and nice-looking home to demonstrate to others they have a well-working, ordered,

"home ecosystem" that is a healthy environment for their families. 'Committed' cleaners clean almost obsessively, spending considerable time tidying up, and doing cleaning tasks to a high standard is a priority for them.

The physical characteristics of the dirt they are dealing with is a constant for all these cleaner types. Some reported having allergies, giving them a particular relationship to the wafting dirt that the vacuum cleaner is designed to control. But when this un-differentiated matter flies around when emptying bags or canisters it may get up your nose and make you sneeze, even if it doesn't make you ill. The visibility of dirt was simultaneously a positive and a negative for participants. Some reported a sense of satisfaction and achievement at being able to see the dirt collected in a canister machine. On the other hand, whether allergy sufferers or not, participants reported taking care to avoid contact with dirt when emptying the canister carefully outdoors.

As the look of a machine deteriorates with use, it tends to be stored out of sight suggesting the mild disgust engendered by dirt may have a role in disposal decisions. Some participants said the look of the vacuum cleaner determined their willingness to keep it 'in sight' - a practical response to lack of space and need for convenience aligns with the degraded aesthetics of the machine. Several participants who had more than one vacuum cleaner kept a less favoured one out of sight, in a cupboard or shed.

So the hygienic design rhetoric of the machines that Forty identified remains significant, and may have consequences for their longevity, with overlapping aspects in current vacuum cleaner designs. Convolved moulded plastic details characterize the design language used to signify technical advancement, which harbour dirt and invite rapid physical deterioration, becoming irrevocably dirty and broken. On inspection, used vacuum cleaners were often covered with a fine dust through static attraction and the materials and design features meant that any damage they had sustained would be impossible to rectify without replacing large plastic components.

This design language, drawing from sci-fi and computer games will become obsolete with shifts in fashion and popular culture. However,

this inevitable dating did not seem to be a problem to most participants, who were happy to have vacuum cleaners that cost little to replace once they no longer work or are unfit to be seen in the house.

Clearly, a number of factors in which dirtiness may be implicated determine the point at which a vacuum cleaner is discarded. One is the disposition of the owner towards 'newness'. All three of Campbell's (1992) types of consumer motivations to acquire new possessions seem to be present in participants' motivations to replace their vacuum cleaners, and their choice of machine.² For example, a 'pristinian' consumer may be less inclined to buy a bagless vacuum cleaner because a conflict of attraction and repulsion is built into this design.

The empirical work suggests that the sense of mild disgust engendered by the dirt that vacuum cleaners capture may have a role in disposal decisions. A machine that is both dirty on the outside and reveals the dirt captured on its insides may need relatively minor mechanical problems or damage to the exterior to prompt disposal.

Discussion and conclusion

The work reported here indicates that the moral framework that developed in the C19 round dirt in general, and dust in particular continues to influence the practice of vacuum cleaning, including decisions about when to replace machines, and therefore, their longevity. The ways in which the machine ages, its styling, the ability to clean it, the nature of its materials are the consequence of design decisions, so may be altered.

The students' involvement in the research proposed forms and materials to promote 'ageing gracefully', prolonging the owner's attachment to the machine, in the context of both individual ownership and service systems. In both contexts, while participants agreed that a durable aesthetic and more 'honorific' materials (Veblen, 1994 (1899)) were attractive, they expressed doubt over the actual durability of materials such as wood or leather, even though plastics are demonstrably fragile. They also indicated that a large component of their trust in a machine derives from its brand

identity, which would be absent in a leasing or service system scheme.

Given that brand identities are among the most pervasive and perhaps powerful of the cultural influences on contemporary consumers, it is appropriate to note their significance in this context. As Douglas puts it, culture 'mediates the experience of individuals' (ibid, p. 38) and in particular, their direct personal experience of the substances that it classifies as dirt. Nonetheless, these substances have agency too and dealing with them requires that we develop habits and routines that can cope with their capacity to directly disgust us.

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² Acquisition because of technical advancement ('technophiles'), newness ('neophiles'), or because they are 'factory fresh' ('pristinians').

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