What we Touch
Touches Us: Materials, Affects and Affordances.
Tom Fisher

Abstract
Using insights from material culture studies to analyse new data, this paper builds on social-historical studies of plastics and literature in the sociology of technology, as well as some design literature to elucidate the ‘fine grain’ of consumers’ relationships with ‘artificial’ materials.

Whereas the literature takes plastic to operate as a signifier of modern supremacy over nature or of a fugitive and protean post-modernity, consumers’ perceptions of these qualities are accompanied by a more physical relationship to the materials. Whereas there is evidence that consumers appreciate plastics’ potential for technical mastery, this cultural knowledge is always accompanied by knowledge gained by direct physical interaction with the materials, which in turn has affective consequences.

Drawing on the work of James Jerome Gibson to integrate the cultural/ rational and physical/ sensorial aspects of our relationship, this paper offers an integrated view of our relationship to the materiality of new objects, and identifies elements of our relationship to plastic objects that are implicated in their disacquisition and disposal.

Introduction
If you have a computer, and have had it for some time, look closely at the keyboard the next time you go to use it. You will see a craftily shaped collection of plastic components that fit, to some degree, the requirements of your hands as you type. If you look hard, you will see other things. You will see that some of the surfaces on the keyboard are shinier than are others. These are the surfaces that your fingers touch most often, where the subtle matte texture given to the plastic of the keys by the designer has worn away, creating another set of surfaces defined by use not design. This pattern is idiosyncratic – their presence relies on your presence and their pattern reflects the exact ways in which you have used your keyboard.

If you use your computer mostly to type words in English, the letter E key will be shinier than the others, because it is the commonest letter in English. If, like me, you are a poor typist you will see that the backspace key is shinier than the others are because you use it so frequently to correct errors of typing, or of thinking.

To acknowledge that these two ‘conditioning factors’, one cultural, one individual, produce patterns of wear that you can observe on your this plastic object is perhaps of fleeting interest. However, coincident with the creation of these wear-patterns another thing happens to computer keyboards as they are used – they collect dirt. You may be able to observe this on yours. The research that is reported in this paper shows that this dirt in combination with patterns of wear are likely to be of more than fleeting interest to a user once they notice them. Because I am interested in such things I have observed that over the several years a computer keyboard lasts this build up of dirt can be quite extreme. It forms dark shadows round the areas that the ends of the typist’s fingers have made shiny. In the most frequently used areas it builds up into ridges that can be detected through touch.
It has the vague silver grey sheen of mud on a winter evening or the collar of a dirty white shirt. It is not dust – it won’t blow or brush away like the particles and fibres that collect between the keys or the dust that clings to a computer monitor through static charge. This dirt is firmly stuck to the plastic surfaces of the keys near to where we touch them, embedded in its texture. (Figure 1)

The dirt and the pattern of wear are indexical signs of our use of a keyboard. My research suggests that the consequences of our reading these signs are highly significant to our experience of material culture. The research has focussed on plastic materials particularly but the insight it provides may provide insights that help us to understand the ‘fine grain’ of our relationship to all objects. Our readings of such signs are embedded in a rich network of factors – they are ‘multidetermined’ and can therefore only be understood through the sort of ‘multimethod’ approach that is so characteristic of design research.

This paper briefly describes the relationship of this research to the existing plastics literature and discusses some of the data it generated, demonstrating how James Jerome Gibson’s work is useful to reconcile the cultural and physical aspects of our attitudes to plastics.

![Figure 1 - a dirty computer keyboard](image)

**Literature**

Some work emerging from the social study of technology (Bijker 1995) has dealt directly with plastics as an example of generic processes of technological development rather than exploring their meaning for users. Nonetheless, this field of enquiry offers very useful models for exploring such multidetermined phenomena in its aspiration to account for the network of ‘actors’ that constitute technological phenomena (Callon 1987, Latour 2000).

Literature that appears particularly accessible from the perspective of design takes a broadly social perspective on the history of the materials. Such studies include those by Clarke (1999) Fenichell (1996), Friedel (1983) Rapping (1980), Schneider (1995) and most notably Meikle (1995), as well as earlier ‘boosterising’ publications by Yarsley and Couzens (1942) and ‘Plastes’ (1941). All of these either remark on or promote plastics’ identity as characteristically modern materials.

Other work that directly engages with the identity of plastics has appeared over the last fifteen years takes its contemporary manifestations to be symptomatic of ‘postmodern’ times. This literature takes its cue from the work of Jean Baudrillard, especially his ‘System of Objects’ of 1969 and the work of postmodern philosophers such as JF Lyotard (1984). The key authors in this respect are Ezio Manzini (1985, 1989 & 1990) and Penny Sparke (1990).
Neither of these bodies of literature more than glances at the object of study of this research. Historical sources don’t allow researchers to engage with the fine grain of users’ relationships to materials. Perhaps because of its relationship to historical study, Manzini’s and Sparke’s approach tends to rely on interpretative methods to read meanings straightforwardly out of objects resulting in a focus on production rather than consumption, as if one determines the other.

A small amount of work in material culture studies connects directly with this research, though it seeks to describe our relationship to materials for rather different reasons. Hawkins (2001) uses plastic bags as a metaphoric marker in her discussion of the ethics of recycling and composting and Lucas (2002) takes an archaeological approach to waste more generally in his discussion of the cultural categories that have determined our attitudes to the disacquisition of objects.

Extensive commercial work has explored consumers’ perceptions of and attitudes to materials but only tantalising glimpses of it are available in the public domain (Mori 1983, SPI 1971, Noreaux et al. 2002). However this research has sought to re-create the spirit of some of this commercial research work. Noreaux et al describe some of the aspects of the research that Peugeot has carried out into the response of users to different materials, plastics particularly, in the context of cars.

Methodology

The research reported here has employed a Kelly’s grid exercise, semi-structured interviews with 21 UK consumers using vignette techniques and objects as prompts and an email survey of a group of specialist users of plastics. It has also involved a good deal of observation and introspective reflection on my part, such as that which starts this paper. The analysis of this rather diverse body of data has been undertaken in the light of the similarly diverse literature that deals specifically with plastics, as well as some work from psychology, particularly James Jerome Gibson’s theory of the perception of affordances.

Much of the data generated for this study is quite generalised in that it was elicited from non-specialist participants’ references to their everyday consumption experiences. However it may be possible to generalise from it, particularly because there is evidence in all of it of the processes whereby we come to make judgements of materials, and by extension, of objects.

Data

The data demonstrates that in their evaluation of materials UK consumers are significantly influenced by the ‘folk knowledge’ that exists about the plastic materials that computer keyboards and many of the other accoutrements of contemporary life are made. However not all of this knowledge is of this type. While a good deal of our ideas about plastics derive from the discourses that have developed in Western culture around plastic materials since their invention in the 1860s and the development of their ubiquitous presence since the 1950s, the participants demonstrated another experience-based ‘stratum’ of knowledge about the materials which interacts with folk knowledge.

At the outset, it appeared likely that the distinctive contribution of the work would be to make a systematic review of the discourses that have grown up around plastics, and to note the ways in which consumers deploy them in particular circumstances. This has indeed been one of the outcomes of the research. It is possible to identify moments in the data when the participants employ three discursive ‘clusters’ which refer to modernity and progress, authenticity and imitation and health and hygiene. The subjects use these cultural concepts – these ideas about plastics – in combination with other more generalised concepts, which derive from taste formations and ideas about the characteristics of the different stages of life.
Taste

Here for example, one of the participants in a group interview, a 20 year old female, speaks about when and where it would be appropriate to use plastic cutlery:

“...and plastic, people don’t tend to want to eat off plastic too much cos it erm, it’s got the feeling like (some people think) you might feels a bit tacky or something, or er just not designed for that sort of purpose cos it’s not usually used, plastic…” (3:105)

She uses the word ‘tacky’ to denote the transgression of taste standards implied by using a plastic object in a particular situation. Her use of this word is significant for the discussion that follows, as it points to another, physical, ‘stratum’ of knowledge and helps to illustrates the way this knowledge about plastic relate to that based in taste.

While these participants mean ‘tacky’ to indicate ‘in bad taste’, other participants used the same word to indicate a sense of physical inadequacy which directly related to the mechanical qualities of the objects they discussed. As they spoke they physically manipulated the objects they discussed – they interacted with them using their senses, they touched them and explored them with their fingers and they made reference to the characteristic sounds and smells of plastic objects. (figure 2)

![Figure 2 - interview prompts.](image)

The senses

We can explore this sensorial dimension to judgements of instrumental fitness in the rather complex usage of the word ‘tacky’. One literal - physical - meaning of ‘tacky’ is ‘sticky’ – a surface which it is coated with something to which other things will stick. If the surface is deliberately coated, say with glue, then the tackiness is useful and presumably welcome. Here, in every case, the interviewees used ‘tacky’ as a negative term.

This negativity is telling. Physical tackiness is likely to be unwelcome and to elicit disgust in a civilised individual; a negative affect. As Rozin (1999) has shown, the power to elicit this reaction is common to a large number of quite different disgust stimuli. Many of these seem to have in common the power to remind us of our animal nature, of our ‘mushy insides’ as he puts it. Stickiness, caused by sweat, blood and other body fluids is a clear example of a potential disgust elicitor of this sort.

In many formulations and uses, plastics seems to be rather good at reminding us of this other, bodily, tackiness. The interview participants mentioned a characteristically ‘sticky’ quality of plastics in connection with objects as diverse as a synthetic teddy bear and plastic tool handles. These materials seem to have some innate potential
to be associated with literally tacky experiences. It appears that this association is built up through experiences which associate a negative, possibly disgusting, sensorial experience with plastics which is invoked in the use of ‘tacky’ along with the cultural and structural aspects described above.

This discussion of the expressions of ‘tackiness’ elicited in response to the plastic items should not be dismissed as idle word play. Rather, this usage indicates the complexity of our relationships to materials, and the objects they comprise – cultural and sensorial elements mix in this relationship. The interviews and other data contain many other instances where cultural and sensorial aspects of plastics seem to coexist in the interviewees’ testimony. Most notable in this respect are their accounts of plastic flowers in which negative taste judgements are concatenated with references that bring to mind physically unpleasant experiences.

**Gibsonian affordances**

Plastics serve as markers for taste judgements and sensorially based judgements at the same time. If we are to understand how these two rather different registers of meaning can co-exist, we need a framework which will account for their relationship. JJ Gibson’s concept of the ‘affordance’ offers us such a framework. For Gibson, rather than perceiving things through a process of itemising their particular qualities we perceive what they afford - how they are useful to us. His idea is powerful for a number of reasons, not least because it is fundamentally relational, and therefore it allows us to resolve the tension between the cultural and the physical in our interaction with objects.

What a thing means to a user, what it is useful for, is not just a consequence of the expectations the user brings to the interaction with the object, but is simultaneously a consequence of the objective properties of the object. As Gibson puts it, an affordance is

‘... not what we call a “subjective” quality of a thing. But neither is it what we call an “objective” property of a thing if by that we mean that a physical object that has no reference to an animal. An affordance cuts across the dichotomy of subjective-objective ….’ (1977: 69-70)

Although the key examples that Gibson uses to illustrate his ideas are taken from interactions with the given physical environment, the invariant qualities of man-made objects also constitute affordances in our environment. He makes it clear that we “were created by the world we live in” (1977: 71) therefore if his ideas are applicable to the perception of the affordances of our world this must include manufactured artefacts. (1)

The mechanism that Gibson suggests for this ‘creation’ is the sensual exploration of the physical world that he sees as an inevitable feature of all human perception. He emphasises that the act of perception is active and embodied – that our physicality mediates all our perception of the world, and therefore of its affordances. As he puts it:

‘..perception of the environment is inseparable from proprioception of one’s own body – [...] egoreception and extoreception are reciprocal.’ (1977: 79)

…which implies that we learn about ourselves through exploring our environment as well as learning about the affordances in our world from this ‘perceptual learning’.

There is striking evidence in the interview data for the sensorial exploration of plastic materials early in life. A young woman spoke about her early experience of and fascination for expanded polystyrene packaging.
“Do you remember putting it in your mouth as a small child? K: Yeah. T: What was that like? K: Weird. Not erm – not that nice, you know, like I say it’s that kind of squeakiness that it’s got in your hand but against your teeth, it’s not quite so nice, really. It sort of did make my teeth feel a bit funny…” (16:11)

The data suggests that physical exploration of this sort early in life furnishes us with what repertoire we have for speaking of the physical qualities of objects and their materials. For instance, another young woman uses similar language to that deployed about polystyrene above to describe the qualities of other plastic objects:

“Plastic squeaks when you hold it? T: Yeah? G: Yeah, even if you’re not holding it tight; you’re playing with a biro – a plastic biro - it squeaks on your skin - and rubber sticks…”. (11:7)

The interview process also showed that this sensorial exploration of the material environment continues from childhood into adult life. The interviewees actively explored the objects they were given as prompts by tapping them and scraping their fingernails against them.

Because of the economic importance of innovation to capitalism, design continually presents us with new materials in new circumstances. We must explore the affordances of these materials if we are to make use of them, or to understand them and fit them into our existing scheme. Contrary to the impression that Manzini gives, affordances can not be wholly ‘built into’ materials and artefacts.

As adults we may do this in a different register of intensity - more discreetly, stroking and touching objects rather than mouthing them as we did as infants. Or we may do it more often in combination with language and explicit rationalisation. As Heft puts it, analysing Gibson’s ideas in the light of Merleau Ponty’s Phenomenology of Perception, we explore the world with ‘cultured bodies’ (1989: 13) which play out en-cultured intentions.

The group of ‘specialist’ users of plastic referred to at the start of this paper were individuals who get a sexual charge from plastic mackintoshes – fetishists in other words. This group provided some quite specific and detailed testimony about the properties of plastics – they were likely to be able to since these properties are relevant to their everyday lives. Although the perspective that this group have on plastics at first made their testimony appear rather different from that provided by the interviewees, it is possible to interpret it quite productively using Gibson’s ideas.

If we take the fetishistic appreciation of plastic surfaces to be the result of the exploration of the affordances of the materials in a non-mainstream context, the physical characteristics of the materials that the fetishists describe can help illuminate the basic character of plastics in mainstream consumption. Alan Costall (1995) has reviewed Gibson’s work to bring out its social dimension. In his discussion he cites the psychologist Leont’ev who suggests that objects are “a ‘crystallisation’ of human activities”. As Costall puts it, they

“invite and constrain us to use them in certain ways, even if this use does not correspond to their intended function. The affordances of artefacts are themselves, therefore, a focus of enduring, and cumulative, social influence.” (1995: 471)

In reference to Gibson’s assertion that “…affordances do not cause behaviour, but constrain or control it.” (Gibson in Costall 1995: 411) Costall means to stress that the origin of an affordance may therefore be any salient aspect of the social situation in which an individual develops. So the affordance of an artefact - or material - allows us to use them in particular ways that suit our physical and psychic needs, both because of their physical properties, and because of the social ‘heritage’ that is associated with them. That heritage may be defined by a small social
entity like plastic mackintosh fetishists, or by a geographical/cultural grouping - like ‘Western consumers’ or ‘UK teen-agers’.

**Fetishists’ perception of plastic’s objective properties**

Considered in this light, the apparent difference between fetishistic and everyday practices using plastics ceases to be a problem. If we consider plastic as providing an ‘affordance’ for sexual gratification, it ceases to matter that a fetishist’s use of plastics is for different purposes than most people’s – their particularities simply mean they recognise different aspects of the materials as positive affordances than do mainstream consumers. This similarities between the structure of the affordance of sexual gratification and plastic’s more quotidian affordances allows us use the fetishists’ testimony about the particular qualities of plastics that bring them joy to inform our understanding of the materials in the mainstream.

The fetishist respondents described the surface quality of PVC using a telling group of words. Along with ‘glossy’ the respondents used ‘oily’, ‘fatty’, ‘buttery-smooth’, ‘slick’ and ‘sticky’ to describe PVC surfaces. All these terms relate to the bodily experience of the material. ‘Sticky’ describes quite well the literal sensation of touching a very shiny, but quite soft and flexible surface like PVC. Shiny PVC fabric also does not slide across itself; it ‘sticks’ to itself and it has a physically ‘tacky’ quality under the fingers. To call a surface ‘Oily’, ‘buttery’ and ‘fatty’ relates it to a class of substances that have in common a sort of oozing stickiness, an unstable, indeterminate quality. Sartre (1957) uses this type of substance to illustrate his discussion of the phenomenon of viscosity that he calls ‘the slimy’.

Other fetishists made it quite clear that the most enjoyable quality of plastic film is its imperviousness, and the sweaty stickiness that results from wearing it. One respondent says that they

“...like the heat and if the garment doesn’t admit much fresh air, like the moisture and seeing them steam up.”

**Sweat and stickiness – a sense of dubious margins**

Generally we dislike the sweat that some plastic fibres make so evident, and by association may dislike the plastic. As Miller notes (88ff), of all the oozing substances that our bodies can produce, sweat is relatively low in the scale of disgust. It is consequently quite easy to imagine that only quite a small force of sexual gravity might transform disgust with sweat into delight. The same force would consequently change the emotional charge of plastics from feelings of disgust to feelings of delight.

What both the fetishistic and mainstream settings have in common is that an objective property of plastics – its impermeability – makes us aware of the margins of our bodies. It destabilises our sense of those margins with affective consequences. There is something unstable and destabilising about this tackiness which demonstrates to us an uncomfortable ambiguity in the margin between our body surface and the outside world by making us produce disorderly sweat.

This is evidence of a characteristically plastic-y stickiness which makes an issue of the margins of our bodies which is enjoyed by a fetishist who likes the stickiness afforded by plastic film, or dreaded by someone for whom cleanliness/hygiene is emotionally charged. In a design context this ‘making an issue of our margins’ can be positive - ‘high touch’ plastics for control surfaces - negative - sticky ‘tackiness’ - or ironic - the gratuitous use of rubber in fashion.
Discussing food containers, one of the interview participants said that she would not use a Tupperware box to carry sandwiches without wrapping the sandwiches first, suggesting that

"The plastic would affect the taste of the sandwich for me" (8:45)

For her the box seemed to be an ambiguous object, in that although it would be physically feasible to put sandwiches directly into it, in her view this would transgress the right ordering of materials in such an context. She implies there is something disorderly about the polyethylene of Tupperware when it comes into contact with food - some unknown component of the plastic could get into the sandwiches. This, by Mary Douglas' definition of dirt as 'matter out of place' makes Tupperware dirty (Douglas 1966).

A common index of the disorderly nature of plastic's surface seems to be its smell. Again, this is a positive feature of plastic mackintosh materials for the fetishists, but denoted the possibility of contamination for some of the interview participants. As one of them put it:

"I think Tupperware tends to be a bit smelly. [...] I think it retains its smell after you take the stuff out." (18:81)

Here, the smell of the object denoted the instability of its surface as it would absorb smells and was reason enough for this individual to avoid using it. Smell serves in this case to indicate the material's ambiguity and consequent untrustworthiness. The significance of smell is reinforced by Rozin and Nemeroff's work on the sensitivity of orifices, and their work on the natural magic principle of contagion by essences. Writing about smell, they suggest that:

"...odor [is] a special case of essence. [It] shares many properties with essence, and my be, at some level in development or cultural evolution, the origin of ideas of contagion." (1990: 212)

Summary and conclusions

Plastics are ambiguous and complex and the relationship between our intellectual and emotional reactions to them are as ambiguous and as complex. To say that plastics are simply evaluated positively when they are the vehicles for the fulfilment of the desire to consume, or negatively when they become waste, or as an aesthetic affront when we ‘wouldn’t be seen dead’ with them, is to ignore this ambiguity and complexity.

With the passage of a relatively short period of time, an object which once delighted, begins to disgust. With the passage of more time a moment arrives when it is necessary to ‘void’ the object from our spatial body and dispose of it. If we encounter the object after that moment, it likely disgusts without question. As Barthes (1988 (1976): 54) put it, plastics are “at once gross and hygienic”.

Plastic’s power to elicit emotions constitutes only one of its affordances – in particular circumstances plastic affords disgust, in others delight. These affordances rely on a coincidence of particular objective properties – ‘invariants’ – in the material, and situational phenomena such as the cultural make-up of the person who is emotionally affected. This data provides more indications of plastics’ potential as an elicitor of disgust than of other emotions, perhaps because disgust is particularly visible in the attenuated communication of an interview.

We can conclude that the following invariant properties of plastics and situational factors are significant for these reactions:
In many thermoplastic formulations Plastics’ have a distinctively ‘fleshy’ quality, shared by no other material. They can be successfully ‘skin-like’; they are seamless; they are warm to the touch; ‘trauma’ to their surfaces is evident, but irrevocable.

Their objective properties help us to conquer some aspects of our own bodily nature and to defend ourselves from external nature. They are part of a ‘humanised’ nature that is familiar, but not completely trustworthy.

Plastics cease to function, become evidently worn, in a particular way. They ‘traumatise’ they do not patinate; they gather dirt rather than ‘charm’ and when they do they elicit feelings of disgust particularly strongly. Perhaps because they are no longer an acceptable element in our humanised nature, they become doubly unnatural.

We are particularly sensitive to the characteristics of plastics’ surfaces and we seem to have a quite rich understanding of them, although everyday life seems to provide relatively little evidence for it. We seem to be conscious that plastics are generally impermeable their surface is often porous. It therefore has the potential to be ‘tacky’ and to pollute us with invisible chemical components and to absorb disorderly matter. These polluting mechanisms seem to operate using the principles of contagion and essence found in natural magic. These principles therefore allow social or moral contagion to take place via plastic objects.

The disgust emotion marks physical and social barriers and margins. We wish to preserve our physical selves from threats to our margins from foul substances and smells and to preserve our sense of the integrity the margins of our skin by avoiding ‘slimy’ substances that put it into doubt. We also locate ourselves socially and culturally in terms of taste judgements and we police these through disgust reactions.

Our exploration of the affordances of the material world brings together the objective qualities of plastics that are implicated in the former set of disgust reactions and the aesthetic properties that are implicated in the latter. The ambiguity of plastics in new goods is invisible to us because we frame it out. When it is brought to our attention by signs of wear or damage or dirt the framing mechanism fails and we are confronted with something that elicits disgust.

Perhaps this ‘something’ has been there all along, the plastic item that we consign to the rubbish bin, or the back of the cupboard, may always have been potentially disgusting.
Notes

(1) Gibson is explicit about the need to see our ‘world’ as whole and to avoid false distinctions between the natural and the man made:

“It is a mistake to separate the natural from the artificial as if there were two environments; artefacts have to be manufactured from natural substances. It is also a mistake to separate the cultural environment from the natural environment, as if there were a world of mental products distinct from the world of material products. There is only one world, however diverse, and all animals live in it, although we human animals have altered it to suit ourselves.” (Gibson 1979: 130, in Costall 1995: 471)

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**Biography**

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Tom Fisher has been a senior lecturer in Design at Sheffield Hallam University since 1991. A Fine Art graduate, he worked for some years as a designer and maker of furniture. This experience led him to note that no body of knowledge of plastics exists that is equivalent to the knowledge of ‘traditional’ materials that he uncovered through craft work and interaction with clients. He is the author of the UK Crafts Council publication ‘Considering Carved Wood’ of 1994 and a number of journal articles on the subject of creativity. He considers the research described below to open up a new field of enquiry that has particular relevance in the context of a user-centred design ethic which aspires to give Designers insights into consumption. This field of study is most closely related to work in the field of Material Culture studies.