



Do Users Know What Designers Are Up To? *Product Experience and the Inference of Persuasive Intentions*

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The study of how users experience designed products typically focuses on the relationship between particular product features and the responses that those features elicit. This article suggests that such work should also consider the design intentions that users infer from those features. In doing so, a distinction is drawn between users responding to a product in a certain way and users recognising that the product was designed to elicit such responses. The consideration of product experience would then parallel literature on the interpretation of many other kinds of artefact, including literary works, artworks, cinema, brands and advertisements. In particular, this article considers empirical studies in the field of consumer research that consider consumers' inferences of advertisers' persuasive intentions. This prompts key research questions about the inferences that users make about designers' intentions. It also suggests a number of promising adaptations to conventional research methods to address such questions. The paper argues that studying the inferences users make about designers' intentions is an open research area with the potential to challenge and complement our understanding of how people experience the designed world.

Keywords – Consumer Response, Design Literacy, Persuasion Knowledge Model (PKM), Persuasive Design, Persuasive Technology, User Experience.

Relevance to Design Practice - The article provides a model that respects users' active and knowing engagement with designed products, spaces, systems and services. This encourages designers to anticipate how users might infer the intentions that lie behind those artefacts and to anticipate how such inferences could affect the ways in which those artefacts are experienced.

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Introduction

Delivering his presidential address to the Association of Consumer Research in 1985, Peter Wright began with the following informal reflections:

I'd like to use this occasion to wonder aloud about a topic that I've been wondering privately about for some time. It's something I think many people would take for granted that we, as students of consumer psychology, obviously must know about; something that I too think we obviously should know about; but something we don't know much about. (Wright, 1986, p. 1)

Wright then proceeded to introduce the idea that consumers develop knowledge of persuasion that helps them to identify how, when and why marketers are trying to influence them. Almost a decade later, Friestad and Wright (1994) published 'The Persuasion Knowledge Model', which elaborated the conceptual foundations for studying how consumers identify that they are involved in 'persuasion episodes' and how they actively manage those episodes to achieve their own goals. In this article, I propose that the Persuasion Knowledge Model is relevant to the study of product experience because just like advertisements, products may be shaped by persuasive intentions, these intentions may be inferred from the product and these inferences may shape users' experiences. Like Wright, I see this as something that we might be expected to know about, something that we should know about, but something that we don't know much about.

This article aims to encourage and facilitate the study of whether, how and to what effect users infer the persuasive intentions of designers. In line with this objective, the focus is not on reporting empirical work, but on establishing the theoretical and methodological foundations on which such work might be developed. The article begins by explaining why aspects of product experience might be thought of as persuasion episodes. I then review the Persuasion Knowledge Model and discuss how it relates to product experience. This leads to the identification of three key research questions for design and the description of how some basic research methods could be adapted to address those questions. I then discuss some extracts from an exploratory study of users' design knowledge so that the reader can assess the plausibility of the proposed work and appreciate some of its potential difficulties. Finally, I outline how considering users' perspectives on designers' intentions might both challenge and complement traditional ideas about product experience.

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Persuading with Products

The art of persuasion is often called ‘rhetoric’, which is traditionally defined as the use of language to inform, motivate or persuade an audience (Richards, 2008). Theories of rhetoric are typically applied to spoken utterances and written texts, where persuasive ‘figures of speech’ can be identified, such as antithesis, metaphor, hyperbole and so on (Corbett, 1990, pp. 427-460; McQuarrie & Mick, 1996). Recently, there has been a drive to apply theories of rhetoric more broadly to emphasise how all attempts to influence meaning or persuade an audience are rhetorical (Foss, 2005, pp. 141-142). This supports the discussion of ‘visual rhetoric’ and the identification of visual equivalents to the standard rhetorical figures (Bonsiepe, 1961, 1972; Durand, 1987; McCoy, 2000; Phillips & McQuarrie, 2004; Poggenpohl, 1998). However, although studies of visual rhetoric consider many media, including photographs, illustrations and moving images (Olson, Finnegan, & Hope, 2008), the rhetorical use of three-dimensional objects has not received so much attention (but see Capdevila, 2004; Selzer & Crowley, 1999; Sheridan, 2010).

Shaping the physical form of products is one of the many activities that designers undertake; some of these forms can be considered as instances of rhetoric. Buchanan (1985) laid the early foundations for this view by stating that “the designer, instead of simply making an object or thing, is actually creating a persuasive argument that comes to life whenever a user considers or uses a product as a means to some end” (pp. 8-9; also see Buchanan, 2001; Kaufer & Butler, 1996). This perspective has since gained prominence with many different authors recognising the potential for all sorts of products to change people’s attitudes and behaviours (e.g. Berman, 1999; Demirbilek & Sener, 2003; Horváth, 2003; Joost & Scheuermann, 2007; Lockton, Harrison, & Stanton, 2008a; Redström, 2006; Schrage, 2004; Wrigley, Popovic, & Chamorro-Koc, 2009; also see Verganti, 2008, 2009). According to this view, designing may be considered as a rhetorical act because the resulting product is seen to make proposals about its possible meanings or claims about its inherent qualities. Products thus effect behavioural change by influencing what things people choose to interact with and how they interact with them. To take a topical example, as people become increasingly aware of the environmental effects of their actions, designers must strive to design products and systems that promote efficient usage and also encourage responsible reuse, recycling and disposal (Lilley, 2009; Lockton, Harrison, & Stanton, 2008a, 2008b; Mazé & Redström, 2008; Wever, van Kuijk & Boks 2008) (see Figure 1).

Upon initial reflection, the idea that designed products are rhetorical artefacts might seem implausible or unfair. Designers are often thought to work in the service of their products’ users;

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Figure 1. The ‘Power-Aware Cord’ from the Interactive Institute, Sweden. The product is designed to visualize, rather than hide, the energy that appliances use, thereby causing people to reflect on how their behavior impacts the environment.

if designers shape products to convey some message this is often seen to be for the user’s benefit. For example, designers might attempt to usefully communicate what the product is, who it is for, how it should be used, what qualities it possesses, who made it and so on (Crilly, Moultrie, & Clarkson, 2009; Karjalainen & Snelders, 2010; Person, Snelders, Karjalainen, & Schoormans, 2007; Ravasi & Lojcono, 2005). This view of design focuses on *informative intentions*, where designers try to inform users or, at most, try to entice or seduce them into certain beliefs or actions. In this view, users are willing beneficiaries of the communication process and designers are not seen to coerce or trick those users into thoughts or actions they would knowingly resist. However, viewing design as such a transparent and benign act fails to acknowledge two important factors. Firstly, without persuasion or ‘nudging’, users, that is *people*, will not necessarily act in ways that best serve their own long-term interests or the interests of the economic, social and natural systems with which they interact (Thaler & Cass, 2008). Products may consequently be shaped by *persuasive intentions*, raising awareness of unpopular issues, changing entrenched attitudes and discouraging habitual actions. Secondly, users are not the only constituency that designers serve. Other agents, such as manufacturers, marketers, retailers, and the designers themselves are all stakeholders in the product’s design. Consequently, the persuasive intentions that shape products may disguise a product’s shortcomings, encourage interactions that the user would not otherwise engage in or suggest possible benefits that the product does not truly offer.

Despite the distinction drawn out above, there is really no clear boundary between informing and persuading. This is because persuasion is achieved through the selective emphasis and

de-emphasis of information; persuasion requires information, and providing or withholding information can be persuasive (McCoy, 2000; Mehta, Chen, & Narasimhan, 2008). For example, with any given product, designers might seek to reveal or conceal the method of manufacture used and thereby accentuate the properties that the product possesses or the user actions that are possible (see figure 2). Taking this example further, mechanical fasteners such as screws, clips and rivets might be exposed for any number of technical or practical reasons. Revealing such details might be seen as informative if those fasteners are physically necessary and if their being visible instructs the user in how the product should be disassembled. Conversely, the appearance of such fasteners might be seen as persuasive if their number, size, type or prominence implies that the product possesses certain qualities or that the manufacturer is of a certain status. Users might thus see some aspects of product form as resulting from a mixture of informative and persuasive intentions, with the balance between these intentions being decided by the users' judgements over whose interests are being served and what means are being used. These judgements might be made not only about the presentation of fasteners, but also about the selection of colours and materials, the treatment of surfaces and junctions, the application of words and symbols and many other design acts that influence the product.

Whether designers' intentions are viewed as informative or persuasive, those intentions shape product form and those forms shape users' experiences. Understanding how people experience designed products thus has important implications for design and there have been many attempts at developing such understanding (for an overview, see Schifferstein & Hekkert, 2008). For example, depending on what form is given to a product, it might appear to be more or less stable, efficient, durable, hygienic, friendly and so on. In the theoretical and practice-oriented literature this is often referred to as product semantics, product character or product meaning (Baxter, 1995; Blaich, 1989; Janlert & Stolterman, 1997; Krippendorff, 2006; Krippendorff & Butter, 1984; Monö, 1997; Muller, 2001; Vihma, 1995). A great deal of experimental work has been done in this area. Consequently, we have some knowledge of (i) the characteristics and characters that people assign to products (e.g. Blijlevens, Creusen, & Schoormans, 2009; Chuang & Chen, 2008; Malhotra, 1981; Mugge, Govers & Schoormans,

2009), (ii) the different assignments that different people make (e.g. Hsu, Chuang & Chang, 2000), (iii) the relationship between the assignments made and the products' attributes (e.g. Desmet, Ortíz Nicolás, & Schoormans, 2008; Hsiao & Chen, 1997; Petiot & Yannou, 2004) and (iv) the relationship between the assignments made and the assignments that were intended (e.g. Govers, Hekkert, & Schoormans, 2002). What we do not have an understanding of is (v) the assignments that people think that they were intended to make or the relationship between those inferences and the first four issues listed above. Consequently, although there are many proposed classifications that help describe how people experience products (see the references above, but also Crilly, Moultrie, & Clarkson, 2004; Gros, 1973; Hassenzahl, 2003; Jordan, 2000; Rafaeli & Vilnai-Yavetz, 2004; Steffen, 1997), none of those classifications are intended to identify or analyse users' inferences of designers' persuasive intentions.

The idea that users infer the persuasive intentions of designers presupposes that users recognise that products are designed and also presupposes that users have an image of a design process that allows for persuasive intentions to shape the product. These suppositions point to a much more general question: what knowledge of design do users possess? Questions about the inference of persuasive intentions must therefore be considered with respect to this broader question, but the focus here remains on persuasion rather than the many other types of intention or constraint that users might believe that a product results from, including technical, organisational and legislative factors. This is because existing work on persuasion knowledge offers well-developed theories and empirical results to build on and because the effects of persuasive intentions are of growing interest in technology and design research (Fogg, 2002; Fogg, Cuellar, & Danielson, 2003; also see proceedings from the *Persuasive* conference series, e.g. Ploug, Hasle, & Oinas-Kukkonen, 2010). Work on persuasion knowledge suggests that users will infer persuasive intentions, but research on persuasive design and technology has so far not attended to this. Focussing on the inference of persuasive intentions is thus warranted and timely, but many of the issues this raises apply to broader ideas about users' knowledge of design, an encompassing phenomenon about which very little is known.



Figure 2. The selection and presentation of fasteners can result from and be attributed to technical, informative or persuasive intentions or from some combination of these. From left to right: Shimano 'XTR derailleur' (bicycle component) © Shimano Inc.; 'HD Mini' (mobile device) © HTC Corp.; 'Horological Machine N°2' (wrist-watch) © MB&F.

The Inference of Persuasive Intentions

Whenever someone tries to persuade an audience of something, there is always the possibility that the audience will recognise that that person is trying to persuade them. For example, on reading a politician's statement, the public might recognise that the politician has certain rhetorical intentions and is using certain rhetorical techniques. This recognition could render the politician's rhetoric less effective or might just alter the public's perception of the statement, the politician or the party that is represented. More generally, reading any kind of text need not just involve engaging with the text itself. It might also involve engaging with some notion of the text's creator and the setting within which the creative act took place (but see Wimsatt & Beardsley, 1972; Barthes, 1977). Just as the author's intended response can differ from the reader's actual response, so too can the reader's inferred intentions differ from the author's actual intentions. However, regardless of the accuracy or sophistication with which the reader attributes intentions to the imagined author, those attributions are an essential part of how the reader interprets and experiences the text (Gibbs, 1999). The terms 'text', 'reader' and 'author' are used here in a very general sense, and the inference of intent is considered central not just to the interpretation of written works (Gibbs, 2001), but also to the interpretation of other acts and media, including artworks (Kuhns, 1960; Levinson, 1979, 1989), spoken utterances (Grice, 1967, p. 45; Searle, 1969, p. 69; Sperber & Wilson, 1986, p. 9), cinema (Bordwell, 1989, p. 65), branding (Rushkoff, 2000, pp. 200, 208-212) and advertising (Friestad & Wright, 1994; Kirmani & Campbell, 2009; Scott, 1994a).

Given the importance attached to the inference of intent in other disciplines, it is notable that no serious effort has been devoted to understanding the inference of intent in design. Instead, the user response literature typically conceives of users as rather unsophisticated readers of products: they are seen to read the product, but not to recognise that that product has been written. For example, users are reported as finding products attractive, easy to use and symbolically appropriate, but little mention is made of whether users believe that those products were intended to be regarded in such ways (see reviews by Creusen & Schoormans, 2005; Crilly et al., 2004; Desmet & Hekkert, 2007). This is despite work in the philosophy of cognition (Dennett, 1987; Vaesen & van Amerongen, 2008) and developmental psychology (Bloom, 1996; Kelemen & Carey, 2007) that argues that people's interpretations of designed objects involve some inference of the designers' intentions. Even where design research does recognise the possibility that users will infer design intent, this work is primarily conceptual in nature and is relatively rare and underemphasised (for example, we must look to specific passages in Bonta, 1979, p. 227; Crilly, Good, Matravers, & Clarkson, 2008, pp. 440-442; Crilly, Maier, & Clarkson, 2008, p. 20; Kazmierczak, 2003, p. 5; Malkewitz, Wright, & Friestad, 2003, pp. 5-6; Van Rompay, 2008, p. 342).

If we are interested in understanding the inference of rhetorical intentions in product experience, it might seem sensible to attend to those disciplines that have historically been most

concerned with the inference of intention. However, many of those disciplines are philosophical in nature. So although they offer valuable inspiration and direction, they have not devoted their efforts to developing the conceptual frameworks, research methods or empirical results that design research requires. Turning to more practical disciplines, there is recent work in consumer research that *has* devoted effort to such matters. Although that work focuses primarily on advertisements, it still provides the best foundations for exploring the inference of persuasive intentions in product experience. This work is first considered here in the form that it was originally presented before examining the questions it raises for design and the methods it offers to address those questions. Before proceeding, just one comment on terminology is necessary. Much more than design intentions can be inferred from a product (e.g. technical performance) and many more intentions than rhetorical ones could be attributed to designers (e.g. artistic expression). However, for brevity in this article any mention of *inference* refers to users' inferring designers' rhetorical intentions.

The Persuasion Knowledge Model

The inference of intention is a major and long established concern in the study of language, literature and art, yet until the 1980s consumer researchers did not focus their attention on how the public's inference of advertisers' intentions influenced that public's interpretation of advertisements (Wright, 1986). This was formally challenged by Friestad and Wright's (1994) publication of The Persuasion Knowledge Model (PKM), which emphasised how consumers develop and use knowledge of persuasion to cope with marketers' claims. The model sets up a symmetrical relationship between agents (e.g. marketers) and targets (e.g. consumers). With respect to a persuasion episode (e.g. an advertisement for a service), each party is depicted as having knowledge of the other party, knowledge of the topic (e.g. the service), and knowledge of persuasion. With these different forms of knowledge in place, the persuasion episode occurs in the interaction between the agent's persuasion attempt and the target's persuasion coping behaviour (see Figure 3).

At first sight, the PKM might appear to privilege the position of the marketer because the language employed seems to assign agency only to an 'agent', an agent who is free to fire messages at a passive 'target'. However, this is actually the opposite of what the model represents because the model is entirely defined from the target's perspective. 'Persuasion attempt' refers to the target's perspective on an agent's behaviour and 'agent' is defined as whomever the target considers to be responsible for such an attempt. What makes the model so interesting is that it emphasises the sophistication of targets who might recognise themselves *as being targets*. The targets *are* assigned agency because they are described as actively participating in persuasion episodes in the knowledge that they are doing so. Even the term 'coping behaviour', which might seem condescending, refers to an activity that is conducted on equal terms with that of the agent, an activity which is often successful. By representing persuasion in this way, the PKM has provoked consideration of a range of

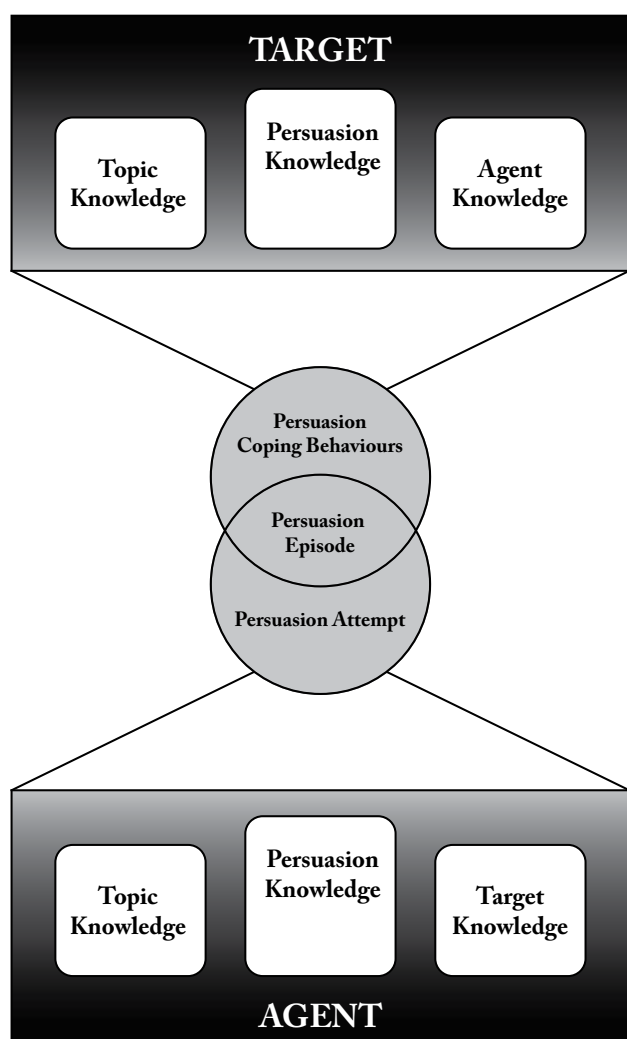


Figure 3. Friestad and Wright's (1994) Persuasion Knowledge Model © Journal of Consumer Research, Inc.

consumer beliefs and actions that are seldom emphasised in more conventional models of response. Consequently, the model has stimulated a new stream of consumer research and the study of persuasion knowledge has become a significant field in its own right (for a recent review see Kirmani & Campbell, 2009).

As outlined earlier, products can be seen as rhetorical artefacts and therefore – in the PKM's terms – products would be 'persuasion attempts', users would be 'targets' and designers would be 'agents'. This suggests that users might infer the rhetorical intentions that lie behind products if they believe that the product is somehow making claims. More generally, the experience of a broad range of artefacts, including software, services and other systems, might all involve the inference of persuasive intentions. However, this article focuses on the inference of persuasive intentions in the experience of physical products because physical products are most different from the advertisements and sales interactions already considered in the PKM literature. Physical products are typically non-verbal (unlike most advertisements) and non-dialogical (unlike most sales interactions). The verbal and dialogical components of most

software and services mean that the experience of those artefacts is likely to be more closely connected to the experience of the advertisements and sales interactions that have already been considered in terms of persuasion knowledge. Should the PKM be found to apply to the experience of physical products, it might also be expected to have relevance to a broader range of designed artefacts.

But Are Products Like Adverts?

Although designed products can be viewed as instances of rhetoric, they are of a different nature to the marketing acts or artefacts to which the PKM is typically applied. In particular, products might be thought of as (i) less obviously persuasive, (ii) less flexible in what they make claims about and (iii) less articulate in making those claims. These possible differences are explored here so that the necessary caution can be exercised in applying the PKM to product experience, but also to demonstrate the validity of that application.

Products are less obviously persuasive than advertisements. This difference is highlighted by the very efforts that researchers have made when emphasising that products can be considered in terms of persuasion (see the works cited in the *Persuading with Products* section). Such emphasis would be unnecessary in describing advertisements because the persuasive nature of such marketing efforts is often self-evident. For example, although an advertisement for a car can seemingly have no other reason to exist than to do some rhetorical work (but see Oates, Blades, & Gunter, 2002), the body panels of that car might ostensibly and actually contribute to the vehicle's physical structure and the performance of its physical roles (Sheridan, 2010). The marketers writing the advertisement and the designers shaping the car both have some discretion in how their final works are realised, even if this view of design is not always celebrated (e.g. see Munari, 2008, pp. 45-48). However, the discretion that the designers have may be less apparent to the user and so the potential for designers to exercise their persuasive intentions might more often go unrecognised.

In addition to being less obviously rhetorical than advertisements, products also differ in what they are rhetorical about. Advertisements typically make claims not only about themselves, but also about things other than themselves. For example, a print advertisement might, through its typography and layout, say "I'm a reliable source of information" and, through its representation of a product, say "this is high quality". In contrast, products might be seen to only make claims about themselves, perhaps saying "I'm reliable, hygienic and safe". However, a different way of looking at this is to view the outer form of the product as distinct from its inner workings. The outer form can be viewed as an advertisement for the entire product making claims about itself (e.g. "I'm easy to clean") and also about other attributes (e.g. "this product is powerful and efficient"). This analogy between products and advertisements can be taken further if products are also seen to make claims about their makers ("look what this brand is capable of") and their users ("my owner is accomplished"). In this sense, although compared

to advertisements products might only make claims about a restricted range of entities, that range is not so restricted as it might at first appear (see Redström, 2006).

Finally, and related to the two points above, when compared to advertisements, products are often less articulate in the claims they make. In the preceding paragraphs, the product has been given a voice to illustrate its rhetoric and this voice is expressed in verbal utterances (e.g. “I’m easy to clean”). In practice, the product will seldom make such claims using language, with the use of conventional symbols often being restricted to the brand markings, promotional materials and instruction manuals that accompany the product. Instead, the physical form of the product is often the primary means of expression, with any claims being made by the combination of shapes, colours and textures. These aspects of form are more open to interpretation than symbols that have well defined meanings such as words; thus any claims that the product is intended to make might be less precise than similar claims made with verbal statements. In essence, however, this is no different to the rhetorical use of images in advertisements. Images can be persuasive without being verbal (Scott, 1994b) and can be rhetorically effective even if they are imprecise (McQuarrie & Mick, 1999, 2003).

Because the persuasive nature of designed products can be less obvious, less flexible and less articulate than advertisements, for people to adopt an inferential stance towards products might require a greater degree of sophistication than would the adoption of such a stance towards advertisements. Compared to advertisements, people may less readily identify that a product is influencing them, that that influence was intended and that specific strategies have been employed to realise those intentions. Consequently, although the existing stream of PKM research provides a useful foundation from which to study user inference of design intent, we cannot assume that its methods and results can be directly applied to the context of product experience. Rather than simply exploiting the current findings of the PKM research stream, we can only use that literature to prompt questions about user inference of design intent and to survey the methods by which we might best address those questions. For clarity, these questions are illustrated below with tentative answers while the methods are illustrated with possible findings. This should not obscure the fact that we cannot yet be certain about what the most valuable questions will be, how they will be answered or what answers we will find.

Open Research Questions

The PKM literature stream and other related work identifies three key research questions regarding the inference of persuasive intentions in product experience. These are: (i) What inferences do users make about design intent? (ii) With what do these inferences vary? and (iii) What are the effects of these inferences? If the inference of persuasive intention is taken as the phenomenon of interest, then the first question relates to the *occurrence* of that phenomenon (‘what happens?’), the second to its *prevalence* (‘when does it happen and to whom?’) and the third to its *influence* (‘what does it do?’). Each of these questions is elaborated in the

sections below. Collectively, they highlight what we don’t know – but might want to know – about the role of inference in product experience. The literature available to support these questions typically describes designer intent *or* user response. These two issues have remained largely separate in the literature and there is very little work directly related to the inference of designer intent *in* user response.

What Inferences Do Users Make About Design Intent?

We might reasonably expect users to exhibit various levels of sophistication in how they approach designed products. On some occasions users might be largely unaware of a certain product’s design or their response to it, but on other occasions users might be conscious that a product results from human design efforts, thus explicitly recognising that the product *has been designed*. They might then further recognise that the product did not necessarily result directly from technical objectives and constraints, but that the designers were at liberty to make certain choices, perhaps with users thinking “the product needn’t have been this colour”. Going further still, users might infer that particular persuasive intentions have shaped the product, perhaps thinking “they [the designers] wanted me to think that this product is hygienic”. Finally, users might infer that particular design tactics have been used to elicit a response, perhaps thinking “they’ve coloured it white to convey cleanliness” (Baxter, 1995; Monö, 1997; Muller, 2001). These inferences are ordered here according to an expected progression in sophistication. It seems unlikely that users could infer intentions or tactics unless they were also able to recognise that products result from design and that designers have the freedom to make choices (for a discussion of motives and tactics see Friestad & Wright, 1994, pp. 4-5).

Just as designers might form all kinds of intentions, users might attribute all kinds of intentions to designers. However, what is most relevant here is the inference of persuasive intentions and the way in which the recognition of non-persuasive intentions plays a role in this (Friestad & Wright, 1995, p. 65). Examples of relevant intentions include: (i) draw attention to the product so that it is noticed; (ii) foster recognition of product type so that it is categorised appropriately; (iii) establish recognition of product origins such as the brand or manufacturer; (iv) generate attraction towards the product so that it is desired; (v) support comprehension of function so that its benefits are understood; (vi) encourage attribution of meaning so that it is regarded appropriately; (vii) promote personal identification with the product so that the user forms some attachment to it; and (viii) stimulate emotional responses such as satisfaction or delight (for a discussion of designers’ stated intentions see Crilly et al., 2009; Karjalainen & Snelders, 2010; Person, Snelders, Karjalainen, & Schoormans, 2007; Ravasi & Lojcono, 2005). When developing such categories of inferred intentions, it would be important to also understand the ways in which users thought those intentions were related to each other and the relative emphasis they place on each intention.

Whatever intentions users might attribute to designers and however those intentions might be categorised, connected and weighted, there is the potential for inferred intentions to be interpreted within a broader design context (Friestad & Wright, 1994, pp. 4-5). Users might thus consider persuasive intentions to be related to or moderated by various other motivations and constraints, including: (i) limited resources (“they were in a hurry to release the product”); (ii) inputs to the design process (“customer complaints must have led to this change”); (iii) other forms of corporate communication (“it’s simple, just like their advertisements”); (iv) response to competitor activities (“they’ve made it look like a product from that other brand”); (v) issues of product family (“they’ve added this feature to differentiate the product from last year’s model”); (vi) cost implications (“they probably can’t afford to offer too many colours”); and (vii) regulations (“they probably *have* to put that warning on”) (for consideration of such influences on design see Bloch, 1995; Crilly et al., 2009; Noble & Kumar, 2010; Person, Schoormans, Snelders, & Karjalainen, 2008). As with the types of intentions that are inferred, these supposed influences on the product need not be accurate for them to influence product experience.

With What Do These Inferences Vary?

The account of user inference of design intent offered above would clearly vary according to a number of factors, including the characteristics of the user, the product and the relationship between the two. With respect to the user, it might be that the inference of intent is more prevalent among older people because they have experienced a greater number of persuasion attempts through the course of their lives. However, one might also expect a localised peak in scepticism among younger people, especially adolescents, who are the target of increasingly subtle persuasion attempts (for a review of possible age effects see Wright, Friestad, & Boush, 2005). Alternatively, it might be that inferring intentions is more prevalent among those who regularly act as persuasion agents because people such as marketers, writers or other creative individuals are aware that persuasive intentions can shape acts and artefacts in general and perhaps products in particular (for the claim that acting as agents changes how people respond as a targets see Friestad & Wright, 1994, p. 3).

In addition to the characteristics of the user, the characteristics of the product might also influence the likelihood and extent to which intentions are inferred. For example, inference might be more likely to occur when users engage with products that are primarily decorative in nature as compared to those that seem heavily constrained by technical performance requirements (see Campbell & Kirmani, 2000). In another view, there is the consideration that intentions might be more likely to be inferred when products are not very well resolved, so that some feature of the product appears surprising or incongruent (see Kuhns, 1960, pp. 10-11). This could heighten users’ awareness that the product results from human intention and action, prompting them to ask, for example, “why is that part a different colour?” This would suggest that so long as user experience is relatively seamless the

design intentions are not readily considered, but when confusion or frustration disturbs that experience, the product becomes more prominent (Winograd & Flores, 1986, p. 36) and the intentions behind it become more prominent too.

Beyond the characteristics of the user and the product, there is the question of what types of user-product relationships make the inference of intention more likely. This might be considered in terms of experience, motivation and interaction. For example, inferring design intentions might be more prevalent among expert users of a particular product whose knowledge of the product line prompts them to reason about design decisions, perhaps thinking “this product is shaped to look like the more expensive products in the range”. Alternatively, taking a strong interest in the product category might make users more attuned to noticing their response to the product, to the features that contribute to those responses and to the possible intentions that lie behind those features. Finally, inferring intentions might be more likely when users are trying to understand how a product works, perhaps thinking “that button’s flashing because I was supposed to press it”. This potentially relates to issues of motivation and attention, where users who are not distracted by other things are more likely to have available to them the cognitive resources that are required to draw inferences (Campbell & Kirmani, 2000).

What Are the Effects of These Inferences?

Users’ responses to products may be influenced by the intentions that they attribute to the designers of those products. For example, users might believe that designers have attempted to mislead them, perhaps thinking, “they’ve put stripes on the side to make it look thinner than it is”, which may lead users to resist forming the interpretation that they believe is intended. Alternatively, users might believe that the designers have attempted to assist them, perhaps thinking, “they’ve used traffic-light colours so that I’ll know when it’s safe”, which may lead users to accept the supposed intended interpretation. In these examples, the user’s inference of the designer’s attitude towards the user moderates response to the product. In Keinonen’s (2010) terms this could be a distinction between the user feeling protected and appreciated or the user feeling tricked and exploited (for a similar discussion of the persuader-helper distinction in marketing see Kirmani & Campbell, 2009, pp. 307-308; Robertson & Rossiter, 1974).

In the above examples, the users’ response to the product is described as though it is initially prompted by the inference of intent. An alternative perspective is that an interpretation is made, the inference of intent follows and reinterpretation then commences. This is like Friestad and Wright’s (1994, p. 13) ‘change-of-meaning’ concept, where the meaning of an agent’s action changes once that action is recognised as a persuasion attempt. This could have at least two plausible effects in response to design. Firstly, inferences might make prior product perceptions stronger if they are mutually reinforcing. For example, if a product seems ‘ingenious’, recognising that it results from human ingenuity may strengthen that initial perception. Conversely, inferences might make prior product perceptions weaker if they

are mutually contradictory. For example, if a product seems ‘honest’, recognising that it has been intentionally shaped to be regarded in that way may weaken the initial perception of honesty (for perceived manipulation in advertising see Coulter, Cotte, & Moore, 1999).

Users might infer not only that they were intended to think certain things about a product, but also that they were intended to behave in certain ways towards it. Although a design permitting or affording some action might be too subtle to be noticed by users (Hartson, 2003; McGrenere & Ho, 2000), product metaphors might be more conspicuous, especially when those metaphors break down and no longer help with the interaction (Djajadiningrat, Overbeeke, & Wensveen, 2000). The prominence of other design strategies might lie somewhere in between these two extremes, including imposing constraints that block user actions, adhering to conventions and mapping control inputs to controlled outputs (e.g. Norman, 1988). Techniques like these might be used to prevent, enable or motivate user behaviour and the user’s recognition of those goals might increase or decrease compliance. For example, where behaviour is being influenced to improve environmental sustainability (Lilley, 2009; Lockton, Harrison, & Stanton, 2008a, 2008b; Wever, van Kuijk, & Boks 2008), users’ recognition of the human efforts behind the influencing technology might make that influence more acceptable. Conversely, where users recognise that intended changes in attitudes and behaviours are really for the benefit of some other party such as a commercial enterprise, such recognition may render the attempted persuasion less acceptable (Laufer, 2003; also see Teisl, Roe, & Levy, 1999).

The three research questions posed above focus on the inference of designers’ intentions, but each is neutral with respect to the designers’ actual intentions. Inferences may be made, may be prevalent and may be influential irrespective of whether there really were any intentions in the first place or whether there is any close correspondence between the inferred intentions and the actual intentions. For example, there may be cases where designers have not tried to influence the user’s perceptions and where it is only the safe and efficient operation of the product that has been designed for. However, this does not mean that intentions will not be inferred by the user, perhaps, for example, with a supposition being made that the utilitarian virtues of the product have been over-emphasised so as to achieve some persuasive effect. It might thus be interesting to ask what correspondence exists between inferred and actual intentions, but this raises a new set of questions relating to the nature of actual design intentions and the means by which they might be elicited and recorded (for recent work documenting the intentions of designers see Crilly et al., 2009; Karjalainen & Snelders, 2010; Person et al., 2008).

Adaptations to Research Methods

Conducting empirical work to address the questions discussed above will present a number of methodological challenges. Users’ inferences will often be unobservable unless they are articulated; users might only articulate their inferences if they are prompted, and prompting users about their inferences might

initiate a process that they do not normally engage in (Brucks, Armstrong, & Goldberg, 1998). To overcome this, some of the standard research methods used in design research and marketing research must be specifically adapted to study inferences. These adaptations are necessary because our focus would not only be on how people experience products, but also on how they regard the processes from which they imagine those products result. For guidance in this we can look to methodological precedent in the PKM literature stream and other fields that study the use of knowledge, the acquisition of literacy and the effects of scepticism. Details of such proposed adaptations are offered in Table 1 so that those who conduct research into the inference of design intent can benefit from the opportunity to relate their work to other work with similar concerns.

The method adaptations proposed in Table 1 are abstracted from their original studies, studies in which the research focus was often something other than physical products. To illustrate the forms of data that such methods might yield and how they might relate to design research, some extracts from one of the example studies are offered below. Full details of the study are reported by Aruk, Jansson-Boyd and Crilly (2011), but even they present the work as an exploratory study focussed on method development rather than as findings derived from an established approach. It is anticipated that much of the early work in studying inference will be of this nature, focussing jointly on developing knowledge of inference and of how inference might best be studied. In this case, the data is from short interviews conducted in public settings in Cambridge (UK) in 2010. Twenty-nine participants were interviewed about the mobile phone handsets they owned. The mean age of the participants was 33; the youngest participant was 19; the oldest was 71; there were 14 women and 15 men. In the summary below, the gender and age of the participants’ precede each quotation. The italics indicate an emphasis in the researchers’ analysis rather than the participants’ utterances.

The questioning strategy adopted in the interviews began with relatively undirected prompts and progressed to more directed ones. The researchers tried to permit, but not encourage, participants to reveal their inferences of design intention with the early questions and tried to strongly encourage, if not enforce, such revelations towards the end. The first question posed was “*What do you like or dislike about your mobile phone?*” In asking this question, the bias was slightly towards the phone itself (the object) rather than the processes from which the phone results (the designing of the object). Perhaps because of this, most of the responses, focussed on the products’ technical features (capabilities and performance) and other objective attributes (colour, texture and mass). Such responses are in line with numerous results from research in marketing and design; people appreciate products for their technical and formal qualities and for the benefits those qualities offer them. However, even with this first product-oriented question, one of the participants still referred to the persuasive intentions that he inferred from the product; another identified that an agent was responsible for the device.

M19 (when prompted about appearance): “It’s got a leather back, that’s quite nice. Fake leather back. *It’s supposed* to look high quality when it’s quite clearly not...”

F30: “I’m just waiting for *them to design* a handset that I like”.

Considering the first of these quotations in the terms of the PKM, what is notable is that the intention of some designer

is inferred (“look high quality”), but also that a tactic to realise that intention is identified (“leather back”). Judgements on the appropriateness of the intention and tactic are not stated explicitly, but are perhaps implied by the language used: “fake”; “supposed”; “quite clearly not”. In the second quotation, no intentions are inferred, but the agent is referred to, even if only vaguely, with the third-person pronoun “they”. In both cases, the

Table 1. Summary of proposed method adaptations for studying user inference of design intent.

Method	Adaptation	Examples
Document analysis	Review user accounts of products, attending to instances where mention is made of the intentions and capabilities of the agents responsible for the products (e.g. brands, manufacturers, designers).	For a review of online forum comments where consumers’ attitudes towards agents’ are analysed see (Aruk et al., 2011).
Observation	Focus on how verbalised inferences of intent are used to demonstrate design literacy. Use this to determine whether such forms of ‘conspicuous reception’ are socially valuable within the interpretive communities to which the participants belong.	For an ethnographic study on the social use of advertising literacy see (Ritson & Elliott, 1999).
Interviews	Use a sequence of prompts that progress from the relatively undirected (e.g. “please tell me about this product”) to those that are explicitly directed towards inference (e.g. “what do you think the designers’ intentions were?”). Identify what level of prompting is required to reveal evidence of users inferring persuasive intentions, and what types of intentions are inferred. Ask participants why products exhibit certain features. Use this to identify the various factors that users can imagine products result from. Note that responses to these more directed ‘why-questions’ should be treated with caution because such questions imply that the product results from a rational process and might therefore elicit answers that do not reflect users’ everyday experiences (see Patton, 2002, p 363).	(Aruk et al., 2011; see main text.) For interview studies of brand and advertising literacy see (Bengtsson & Firat, 2006; Moore & Lutz, 2000; O’Donahue & Tynan, 1998). For the use of ‘why’ questions about products and an analysis of users’ ideas about the influences of ‘styling’, ‘manufacture’, ‘operation’, and ‘technology’ see (Woolley, 1983, 1992).
Protocol studies	Analyse the protocols from interactive tasks and classify utterances according to whether the user is simply oriented toward the product as a thing that exists or as a thing that results from persuasive intentions.	For classification schemes derived from studying response to advertisements see (Brucks, Armstrong, & Goldberg, 1998; Underwood & Ozanne, 1998).
Attitude scales	Invite participants to indicate how much they agree with a list of statements such as “design’s aim is to make the product work effectively” or “design’s aim is to make the product appealing”. Use this to gain insight into users’ knowledge of design intentions. Ask participants a list of questions such as “when products {tactic}, how hard is the designer trying to {list of effects}?”; tactic might include items such as “are brightly coloured” or “show inner workings”; list of effects might include items such as “grab your attention” or “help you learn about the product”. Use this to gain insight into users’ knowledge of design tactics (the means by which the intentions are realised).	For analogous studies on advertisements see (Obermiller, Spangenberg, & MacLachlan, 2005; Obermiller & Spangenberg, 1998). For an analogous study on television advertisements see (Boush, Friestad, & Rose, 1994; also see Cotte, Coulter, & Moore, 2005; Friestad & Wright, 1995).
Experiments	Present participants with geometric forms that are claimed to either result from designers (intentional), from computers or from nature (unintentional). By recording the ways in which participants respond to these stimuli, assess the influence that knowledge of intention has on form perception. Generate a range of products that differ only in some specific detail (e.g. corner radius). Ask participants how hard the designer has tried to make the different products appear to possess specific qualities (e.g. friendliness).	For a similar study on verbal metaphors see (Gibbs, Kushner, & Mills, 1991). For a similar study on television advertisements see (Campbell, 1995; also see Kirmani & Zhu, 2007).

agents or their intentions are referred to while criticisms, rather than compliments, were being levelled at the handsets.

The second question posed was “*Why do you think your phone is the way it is?*” If clarification was required, the researchers used a prompt of the form: “*Earlier you said that you {liked} that your phone is {angular}. Why do you think that your phone is {angular}?*” By asking users “why”, the researchers expected to encourage a search for reasons, suspecting that those reasons might potentially be attributed to some sentient agent who had control over the phone’s properties such as manufacturers, designers or brands. Responses to this question clearly revealed inference, with about half of the participants making some implicit or explicit reference to an agent responsible for design decisions. Typically these responses included terms such as “they” (as above), “the designers”, “the people”, “the company” or some reference to the brand name. Participants often interpreted these agents as being aware of the user and striving to offer something that the user wants or needs.

M22: “I’m guessing *the company have looked* at what people want from their phone and *designed* in retrospect of that.”

M43: “I guess it’s [the shiny face of the handset is] just a *design statement* really.”

In the first of these quotations, the participant reveals his suspicions over how the agents operate. The agents are thought to investigate the targets and to shape products in line with their findings. It is unclear who is ultimately thought to benefit from this process or whether it is considered to result from honest or deceitful intentions. In the second quotation, the participant reveals his understanding that not all product features are present for technical or practical reasons. He understands that designers have some discretion in how they shape the product and that they can therefore choose to make design statements. The researchers reported that other participants also offered such basic references to design in an effort to express why an agent may have included or omitted certain features.

The third question the researchers asked was “*When you are looking at, or using, products such as mobile phones, how aware are you that those products have been designed?*” This final question was intended to explicitly encourage reflection on intentional processes by prompting consideration of the agents responsible for the product. In response, a few participants indicated with confidence that design was often something that they reflected on, a normal part of their product experience. This was the case even for some of those who had not revealed evidence of inference in response to the earlier questions. Other respondents acknowledged the plausibility of recognising that products are designed, but indicated that they did not believe that such thoughts were common.

F27: “I’m very aware they’ve been designed, they’re sort of *designed to look nice*, to appeal to people.”

F38: “Yeah I suppose *you do* think that, because they differ so much don’t they. *I don’t* suppose I really gave it much thought to be honest.”

In the first of these quotations, the participant asserts her awareness of design, but given how directed the question is, it is not possible to determine whether this is merely attributable to the social pressure to appear knowledgeable. The statement that products are designed to be appealing to people is more interesting because it at least indicates a plausible category of attributed intentions, even if the participant’s spontaneous inference of such intentions cannot be assessed. In the second quotation, the participant appears to at first recognise the idea of inference and uses intentions as an explanation of product variety, but then suggests that considering design is not a routine activity for her. Other participants required further explanation of what the third question meant and still answered in the negative. Aruk et al. (2011) report that the older participants in the study claimed not to draw inferences from products and did not demonstrate any interest in the idea of thinking about design. The age-related issues that Wright and colleagues have discussed might be relevant here, but it remains unclear whether age was an influence on persuasion knowledge, or whether the product category was simply of less interest to the older participants.

The interview fragments offered above are intended to demonstrate both that it is possible to study the inference of rhetorical intention and also that the relevant data from such studies might be subtle and open to interpretation. As indicated in Table 1, interviews that pose increasingly directed prompts are not the only method available; other methods might be applied, either independently or in combination. Ultimately, a mixed methods approach is likely to be most effective because methods that are well suited to determining when and how intentions are inferred such as observation studies are not necessarily well suited to understanding what prompts such inferences or what they vary with. Similarly, those methods that can best determine the effects of inferences such as experimental studies are not necessarily well suited to uncovering what those inferences were or why they were made. Of course, beyond those approaches outlined above, many other approaches might also prove to be productive. Further opportunities may open up as researchers creatively develop and refine new techniques that are suited to eliciting, recording and analysing users’ inferences.

Conclusions

By empirically investigating the inference of rhetorical intentions in product experience, contributions would be made to design research and also to other related disciplines. For design research, describing the occurrence, prevalence and influence of the phenomenon would contribute to our understanding of product experience. Developing and refining the methods capable of accessing and interrogating that phenomenon would also make valuable methodological contributions. These advances would be of primary interest to those researchers who study the way in which users experience products, spaces, systems and services, and also to those who study the design of such artefacts. Beyond design research, work on inference in product experience would also be of interest to those disciplines concerned with the

production and interpretation of other communicative media. For example, print and television advertisements often contain images of the physical products that are being promoted. Advertisers can potentially use these products and their representation rhetorically, just like the accompanying text, voice-over or other images. As such, consumer researchers who have so far only applied the PKM to marketing activities might be encouraged to consider the application of the PKM to those products that are being marketed.

Considering the role of inference in product experience focuses attention on the motivation that underlies much of the existing product experience research. Although seldom acknowledged, there is an implicit assumption that studying the relationship between product features and user experiences can empower designers to design products that more reliably direct or constrain the way in which people experience those products. In this sense, research into product experience is either conducted primarily in the service of industry or is conducted in the service of users only indirectly by seeking to offer designers a better understanding of those users. By attending to the concepts outlined in the PKM and by examining other related work, we might additionally focus on how research can serve users more directly. For example, rather than studying product features and the experiences that they promote, we might instead study the experiences intended by designers and the ways in which products are shaped to encourage those experiences. The findings from such work could then be disseminated not just through channels that attract the attention of designers and design researchers, but also through channels that attract the attention of users. This could equip users with a more nuanced knowledge of design practice that they could then employ to better defend themselves against whatever rhetoric they perceive in products (for an extensive account of such arguments about advertising education see Boush, Friestad, & Wright, 2009; also see Wright, 2002, pp. 680-681; Wright et al., 2005, p. 232).

Whether performed in the service of academia, industry or society, researching the role of inference in product experience would add to our present knowledge about user response and user behaviour. In recent years, researchers of design and technology have been increasingly explicit in discussing the potential for products to influence what people think and do. As artefacts have been reframed as persuasive artefacts, attention has been focussed on the relationship between designers' rhetorical intentions and the effects that the resulting artefacts have on users. As a consequence of this focussed attention, we now have a much better understanding of the variety of persuasive approaches that are available and of the ways in which those approaches can be effectively combined. However, despite such contributions, we still don't know whether users are aware that they are the target of persuasive design intentions. More generally, we don't know what users think about design, when such thoughts are relevant to product experience or what effects these thoughts have on those experiences. Of course, it might be that inferences are only very seldom made by a small group of people in very particular situations and that the effect is insignificant. However, if the study of persuasion knowledge in other disciplines offers any guidance,

we might expect that the inference of persuasive intentions often has a profound effect on product experience. If so, surely that is something we should know about.

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