The Soul and the Machine: Humanlike Machines and Machinelike Humans
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Descartes attempted to distinguish the ensouled self from the machinelike body. Freed from Christian strictures, science has substituted the brain for Descartes’ soul. Although the Tin Man longed for a brain, computerized robots may already have one. As a result, humans may need to become machinelike in order to survive.

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How Do Humans Interact with Machines? Implications for Experience and Identity

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Paper #1: Object Experience and Object Consumers
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Paper #2: Automation and Identity
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Paper #3: Touch-Sensitive Computing Interfaces as Drivers of Experiential Consumption
Christian Hildebrand, University of Geneva, Switzerland
Johnathan Levav, Stanford University, USA

Paper #4: The Soul and the Machine: Humanlike Machines and Machinelike Humans
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SESSION OVERVIEW

Advances in digital technologies and artificial intelligence are changing the world. In fact, we have come a long way in less than a decade. Picture this: when Jones is on his way home, the smart thermostat already knows that and turns on the heating system to automatically warm his house. Once he arrives home, he quickly puts some ingredients in the bread-making machine to make some bread for dinner. Then he sits down comfortably on his couch to order a birthday gift for a friend on his tablet. Just a few years ago, it was hard to imagine this mass diffusion of technology in every realm of consumption, from the smart home to automation to touch-sensitive devices.

However, despite the transformational impact on everyday consumption of recent technological progress, we know surprisingly little about human-machine interaction in the marketplace. For example, does interaction with machines shapes our identity and consumption experience? Does interaction with humans in turn create an experience for machines?

This special session brings together papers spanning different technological contexts to showcase this exciting research domain. The papers feature research on the Internet of Things, automation, computing interfaces and human-machine interaction. This special session will contribute to the consumer behavior literature by providing timely insights into the value of technology. First, it complements the literature on the consumption experience of technological products. Previous research shows that interaction with technological products can create both positive and negative experiences (Eklin 2016; Mick and Fournier 1998; Wilcox and Stephen 2013). This special session complements this research stream to present these experiences from different perspectives. Second, this special session answers the call to investigate how technological developments may affect people’s sense of self (Reed et al. 2012). Recent research suggests that consumers develop digital extended selves (Belk 2013). This special session examines how the rise of more sophisticated technology, such as robotics and artificial intelligence, affects sense of self.

Given the lack of research on these new technologies, new theory is needed in order to define foundational constructs and processes and provide direction for future research. This special session starts with a theoretical paper on humans and machines interaction. The first paper “Object Experience and Object Consumers” develops a framework to capture how consumers can access object experience with Internet of Things devices in the smart home domain. The second paper “Automation and Identity” investigates how identity can influence preference of automation with empirical data in various consumption contexts. The third paper “Touch-Sensitive Computing Interfaces as Drivers of Experiential Consumption” examines how interaction with computing interfaces can change consumption experience with field and lab data. The final paper “The Soul and the Machine: Humanlike Machines and Machinelike Humans” discusses the fundamental issues concerning how humans can coexist with machines and how technology is revolutionizing the concept of self. Together, these papers will advance our understanding of the technological trends in the marketplace and their significance. This session would be particularly of interest to researchers interested in technology, identity and experiential consumption.

Object Experience and Object Consumers

EXTENDED ABSTRACT

The consumer Internet of Things (IoT) has the potential to revolutionize consumer experience because consumers can actively interact with smart objects. Hoffman and Novak (2016) have proposed using assemblage theory (DeLanda 2006) to conceptualize consumer experience in the IoT, focusing on the smart home domain. In this paper, we draw on that conceptualization to develop a framework for understanding how object experience emerges in the smart home, how consumers can access these experiences, and the implications of object experience for expanding the domains of consumer behavior.

A first step toward object experience is consideration of object ontology. The human-centric approach considers experience from the perspective of the human, and so precludes our ability to evaluate objects has having the capacity to interact with other entities, enabling other objects or humans or constraining other objects or humans. In a position consistent with the object-oriented ontology perspective (Harman 2002) that has recently emerged in consumer behavior research (Canniford and Bajde 2016), we argue that it is not just consumers that have their own ontology; so do objects.

A critical assumption in our approach is that smart objects, as well as the assemblages that form from consumer interaction with these objects, and objects with each other, have meaning on their own and are something more than passive entities that consumers possess with meaning (Belk 1988). Smart objects, possessing their own ontology, equally exist alongside consumers in the relationship. Objects do not exist just for consumers. They engage in interactions on their own and from these interactions, their experiences emerge. But these experiences are very different from consumer experiences.

To develop our conceptualization, we start with three properties that define the ontology of smart objects: agency, autonomy, and authority. While it is straightforward to argue that the constructs of agency, autonomy and authority are relevant to consumer behavior, we submit that smart objects in the IoT also possess these characteristics. Drawing on the computer science literature on autonomous agents, smart objects have agency to the extent that they possess the ability for (inter)action (Franklin and Grasser 1996; Latour 2005), having the ability to affect and be affected. Autonomous objects can function independently without human intervention (Parasura-
man and Riley 1997 and independently interact with other entities, serving their own agendas (Franklin and Graesser 1996; Luck and d’Inverno 1995). Smart objects possess authority when they can implement communication and decision-making with other smart objects and with humans (Hansen, Piggozzi, and van der Torre 2007).

We then define object experience as an assemblage that emerges from all object-centric interactions, including the part-whole interactions of the object and the smart-home assemblage of which the object is a part, the part-whole interactions of the object and the various smart home micro-assemblages of which the object is a part, and the within-assemblage interactions of the object with individual smart home components. The main difference between consumer and object experience is that consumers as entities are realized not only through interaction with the external world, but also through interactions inside themselves, whereas objects are only realized through external interactions with other entities (Bryant 2011). However, Bryant (2011) also notes that object realization likely resides on a continuum, so we can argue that even though objects are not living, to the extent that they are smart, they actually can operate on themselves to a certain degree. This suggests that the properties and capacities of a smart object will dictate how it is realized in interaction with other objects and the kinds of experiences it is capable of having. If objects can experience, does this mean they are conscious? Recent work in neuroscience suggests that consciousness can be measured, is graded, and can be found in small amounts even in certain simple systems (Tononi and Koch 2015). Thus, object consciousness can be quantified. However, while many believe machines will eventually achieve consciousness, most think that machine consciousness will not be like human consciousness (Bostrom 2014).

Next, we evaluate how object experience can be perceived by consumers. Because consumers can never have direct access to the exact properties of an object, they can only interact with it in the context of an assemblage. So, experience is constructed from that interaction. We propose that consumers can speculate about object experience through the mechanism of anthropomorphizing metaphor (Bogost 2012a). In this approach, anthropomorphism (Epley, Waytz and Cacioppo 2007) is applied as a metaphor where we strive to consider the object’s experience not from our own perspective, but by speculating what the object might perceive things from its own, (non-human) perspective.

Finally, we explore the implications of the concept of object experience for consumer research. Marketing scholars tend to view intelligent agents from the perspective of how marketers can use them to improve the effectiveness of their marketing efforts to human consumers (Kumar, et.al. 2016). But, what if instead, we view a smart object as an “intelligent agent” which itself is a consumer that can be understood and marketed to directly? We introduce the idea of “object consumers” to explore what it means to be a consumer. Object consumers can have the equivalent of affective responses, such as when Brad the Toaster (Rebaudengo, Aprire and Hekkert 2012) is only happy when he is making lots of toast. Object consumers can make decisions, such as when Amazon’s Dash Replenishment service allows washing machines, pet feeders and printers to re-order laundry detergent, pet food and printer cartridges on their own they are running low (Rao 2015). Objects consumers can participate in consumption such as when, through a smartphone app, smart refrigerators can display the inside of her refrigerator to a consumer at the grocery store and suggest products and recipes contingent on what she already has at home. The consumer IoT is beginning to revolutionize consumption and consumer experience in a broad and growing range of consumer-facing categories. Object experience and how consumers can access it can contribute to a fuller understanding of the nature of consumer behavior, and its expanding domain, in complex, interactive environments like the IoT.

Automation and Identity

EXTENDED ABSTRACT

Automation is transforming consumption. Innovations such as GPS and food processors perform tasks that would normally require people’s skills and effort, allowing us to accomplish more in less time. Whereas anglers in the old days relied on their experience to locate fish, now with a click on a technological device they can know which type of fish is in the areas and at which distance from their boat. Across domains such as food, commuting and entertainment, products are increasingly integrating automated features that improve their efficiency, resulting in higher utilitarian-driven satisfaction.

However, our research documents a drawback of automation for the utility of consumption. Consumers like products not only for their utilitarian-benefits, but also in light of their “non-consumption utility” (Loewenstein 1999). Of particular importance for skill-related consumption, consumers often use products to signal their identities (Berger and Heath, 2007). When consumers are performing tasks to signal their identities, they derive non-consumption benefits from attributing the outcome to their own skills or efforts. By performing a task that would otherwise be performed by the consumer, automation decreases the extent to which consumers can attribute the outcome internally, and in turns reducing the preference for automated products. In seven studies in different domains (e.g., cycling, bread-baking) and with different approaches (correlational, experimental), we test the hypothesis that identity goals lead consumers to forgo automated products in favor of non-automated products. Due to the word-limit, we are going to discuss four studies in details.

Study 1 documents the link between strength of identification and preferences for automation with a manipulation of identity salience. 338 Dutch students were asked to either write for five minutes on what Dutch biking culture (vs. Dutch flower culture) means to them. Then they were asked to read a bike purchase scenario and make a choice whether they want to have a free automated feature which assists the pedalling of the biking task. We found that participants were less likely to choose the free automated feature in the biking priming condition compared to in the control condition (M_biking = 66%, M_control = 78%, Chi-square = 5.79, p = .016).

Study 2 extends the findings of Study 1 with a consequential choice. 406 lab participants were asked to finish a coloring task. They could choose either to paint with a color choice automated feature (paint-by-number) or to paint with the colors they choose. Then they were asked questions regarding internal attribution and identification (painting). 406 lab participants were asked to either write for five minutes on what Dutch biking culture (vs. Dutch flower culture) means to them. Then they were asked to read a bike purchase scenario and make a choice whether they want to have a free automated feature which assists the pedalling of the biking task. We found that participants were less likely to choose the free automated feature in the biking priming condition compared to in the control condition (M_biking = 66%, M_control = 78%, Chi-square = 5.79, p = .016).

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willingness to borrow either a bread-baking machine or a dough-mixer on a bipolar scale. These two machines were pretested to present different degrees to which they allow to attribute the bread to the skills of the users. Afterwards, participants answered questions regarding expertise and perceived outcome. As expected, participants in the identity conditions were less (equally) willing to borrow the bread-making machine (dough mixer) than participants in the non-identity conditions (Bread-making machine: $M_{strong} = .91$, $SE = .18$ vs. $M_{control} = 1.51$, $SE = .18$; $F(1, 402) = 5.80$, $p = .016$ vs. dough mixer: $p = .74$). Additional analyses reveal that neither expertise nor perceived outcome could explain the findings.

Study 4 aims at showing that strong identifiers’ resistance to automation is contingent on products being framed as replacers of skills. If the need for internal attribution drives the documented effect of identification on preferences for automation, automation should be perceived more negatively when framed as replacing the user’s skills. When automation is framed as allowing users to deploy their skills, strong identifiers should perceive automation less negatively. 203 lab participants were randomly assigned to one condition of a 3 (no automation vs. skill-replacing automation vs. skill-allowing automation). Participants were shown an advertisement for a cooking product and asked to evaluate its attractiveness. In a between-participants design, we manipulated whether the product was a non-automated cooking set, an automated cooking machine framed as replacing the user’s skills, or an automated cooking machine framed as allowing for the user’s skills. These products were pretested to show varying degrees to which they are skill-replacing or skill-allowing. Then participants indicated their identification in cooking. As predicted, stronger identification corresponds to higher liking of the product in the no automation condition ($b = .18$, $t(133) = 3.14$, $p < .01$) whereas stronger identification leads to lower liking of the product in the skill-replacing automation condition ($b = -.33$, $t(131) = -4.34$, $p < .001$). Moreover, in line with our predictions about the role of internal attribution, this effect disappeared in the skill-allowing automation condition ($p = .39$).

This paper makes several theoretical contributions. First, despite the prevalence and the growing trend of automated products in the marketplace, consumers’ reaction to these products have been understudied. Second, while the consumer identity literature has focused mainly on the product acquisition and display, this research takes an action-oriented perspective and highlights how identity-based consumption relies on consumer being able to attribute consumption outcomes to their skills. Our findings have also important managerial implications. In particular, our work offers actionable insights into a number of important marketing decisions, including targeting, product innovation, and communication.

**Touch-Sensitive Computing Interfaces as Drivers of Experiential Consumption**

**EXTENDED ABSTRACT**

This paper explores the idea whether the input-modalities of novel computing interfaces change the psychological process, preference, and actual choices of the person using it. Do changes in the input-modality of a computing interface systematically affect how consumers experience a shopping process, the products they choose in response, and their ultimate shopping expenses? We explore and answer these questions in a series of field studies and laboratory experiments across a wide range of product categories (automobiles, spa packages, and custom-made bikes). The findings of this research reveal that touch-sensitive interfaces relative to touch-insensitive interfaces render the same shopping task more experiential and less instrumental. This change in consumers’ experience has a series of critical downstream consequences such as a greater sensitivity toward the benefits of hedonic product features relative to utilitarian ones, which ultimately drive greater shopping expenses. These results highlight that the malleable factor of input-modalities of computing interfaces can profoundly change how people experience even the same content and how they systematically change consumer’s preference in predictable ways.

The conceptual background of the current research is built around recent work on the role of preference modalities and the role of touch as a driver of attachment toward objects (Krishna 2012). A prominent finding in the latter research is that objects that are actively touched, or come into contact with the self, are judged more positively (Olausson et al. 2008). These effects were found to be even stronger for more affect-rich relative to affect-poor stimuli (Shu and Peck 2011). These more direct forms of touch may even persist in the context of more indirect (or mere) forms of touch using touch-sensitive interfaces (Brasel and Gips 2014; Peck, Barger, and Webb 2013). Thus, the central proposition of the current research is that the use of touch-sensitive interfaces promotes more experiential (shopping) experiences during a product configuration task and increase the choice of more hedonic product features, ultimately leading to more higher-priced products.

In Study 1, we examined the influence of touch-sensitive interfaces on actual consumers’ product configurations in cooperation with a large European car manufacturer. We collected data of N=95,886 car buyers over a time-span of 2 years and merged two distinct streams of data. We combined the data of actual car configurations from the manufacturers’ ordering system with on-site tracking data logging customers’ device information during the car configuration process. In line with our proposition, we find that customers using a touch-sensitive (such as a tablet) relative to a touch-insensitive interfaces (such as a desktop computer) configured significantly more feature-rich, higher priced cars ($M_{desk=opt} = 19.3$, $M_{tablet} = 21.4$, $t(95,884)=9.267$, $p<.001$) which were ultimately higher priced ($M_{desk=opt} = €52,461.82$, $M_{tablet} = €61,563.93$, $t(95,884)=18.05$, $p<.001$). Although Study 1 provides initial support for our proposition, the current results are likely to be affected by various self-selection effects of the field data.

Study 2 was designed with the purpose to examine the proposed direction of causality and to assess consumers’ subjective experiences during a product configuration task. In cooperation with a European market research company, N=205 prospective car buyers were pre-screened to own both a tablet and a desktop PC, and were randomly assigned to configure a car for themselves either using their own touch device or desktop PC. As predicted, the use of a touch-sensitive interface relative to the touch-insensitive interface caused significantly more feature-rich, higher priced cars ($M_{desk=opt} = €40,100.70$, $M_{tablet} = €44,566.72$, $t(203)=5.491$, $p<.001$), consisting of significantly more hedonic relative to utilitarian product features (identified by pre-test), as well as a significantly more experiential configuration experience which mediated the main effect on price ($95\% CI_{ExpConfig}=[687.04; 2230.96]$).

Study 3 was designed to rule out a series of alternative explanations by using non-owned devices and holding screen size constant. A total of N=70 participants were randomly assigned to configure a bike for themselves in a lab setting, either using a touch-enabled or a touch-disabled tablet (with mouse input). In line with our theorizing, we find that consumers using the touch-enabled tablet perceived the configuration process substantially more experiential ($M_{touch=enabled} = 5.66$, $M_{touch=disabled} = 4.59$, $t(68)=3.923$, $p<.001$), explaining the significant increase in consumers’ choice share of hedonic (relative to utilitarian) product features (as rated by a pre-test; 95% CI = 3.14, $p=.74$). Additional analyses reveal that neither expertise nor perceived outcome could explain the findings.
Studies 4 and 5 were designed to provide an experimental field demonstration and a generalization across product categories respectively. In Study 4, we conducted a field experiment in cooperation with a Swiss day spa. In this study, N=75 actual consumers configured their preferred day spa package for themselves mirroring the experimental setup of study 3 (random assignment to touch-enabled or touch-disabled tablet). As predicted, the touch-enabled vs. disabled tablet caused significantly higher-priced day spa packages (M TouchEnabled = CHF 554.61, M TouchDisabled = CHF 328.89, t(73)=3.658, p<.01), which was mediated by the substantially greater experiential as opposed to instrumental perception of the configuration process (95% CI95% CI95% CI95% CI [44.76; 184.94]).

In Study 5, participants (N=180) chose for each of 28 product categories whether they would choose a tablet device or a PC with mouse input to configure a product for themselves. Following the binary choice between both devices, consumers rated each product category on a utilitarian vs. hedonic scale based on prior work. A logistic mixed effects model with random intercept revealed that consumers choose multi-touch devices for more hedonic product categories (p<.01). However, qualitative interviews revealed that consumers were not aware of the effect that the device itself may have on their purchases.

Overall, the current work contributes to the emerging literature on human-computer interaction and preference modalities in consumer research, highlighting the critical interplay between computing interfaces and human perception (i.e., haptics). Contributing to prior work on consumer self-designs and customization, the current findings also highlight a novel antecedent by revealing that the computing interface consumers use when entering the self-design process can systematically affect their preference for specific product features and how they ultimately experience the process of a product configuration task.

The Soul and the Machine: Humanlike Machines and Machinileike Humans

EXTENDED ABSTRACT

Where does the self reside? What makes us human? Can a robot, like a corporation, become a legal being? Can it become a person? Such questions lie at the heart of this inquiry. They are no longer questions of philosophy or science fiction, but involve very real issues that we will have to deal with in coming decades. Is a robot still a possession or a tool as it becomes more autonomous? Who is to be held responsible if a self-driving car has an accident? Are computers becoming more intelligent than human beings? If computerized robots can learn, reprogram themselves, and reproduce themselves, will they need mere humans? If not, can we humans enhance ourselves enough to keep up with our creations? With biological and genetic enhancements and mechanical and computerized prostheses, can humans in fact approach immortality? Can we, alternatively, upload our consciousness to computers and the devices that house them? And what becomes of the idea of the self as machines become more humanlike and humans become more machine-like (Black 2014; Johnson 2008)?

Consumers are likely to first encounter robots directly in the home, health care facilities, self-driving vehicles, and in service contexts such as retailing, hotels, and restaurants. The robots in these contexts may or may not be humanoid (android if male, gynoid if female), but regardless, they are likely to be anthropomorphized and regarded as human-like (e.g., Aggarwal, and McGill 2007; Belk 2016; Brown and Ponsonby-McCabe, 2014; Goudey and Bonnin 2016; Landwehr, McGill, and Herrmann 2011; Lanier, Rader, and Fowler 2013). They may also potentially be regarded as surrogate selves.

Robot selves frame two changes in the notion of extended self in “The Age of Robots” (Moravec 1994). The first is the prospect that as we acquire personal robots to serve us, we will begin to think of these devices as extensions of our selves, continuing a progression from the extended self (Belk 1988) to the digital extended self (Belk 2013) to the robotic extended self (Groom, Takayama, Ochi, and Nass 2009; Nishio, Watanab, Ogawa, and Ishiguro 2013). Fictional media portrayals help shape our hopes and fears regarding robots and the extent to which we may identify with them (e.g., Barsanti 2014). The second, and potentially more profound prospect is that these robots will evolve from programmed tools to semi-autonomous and autonomous beings that can become non-human legal persons and perhaps moral persons with selves of their own. Robots displaying their own personhood and selfhood go beyond issues of anthropomorphic projection and offer a further catalyst for considering what it means to be a person or a thing. There are even forecasts that we may someday soon marry robots (Levy 2007). Robots, whether as a special object or an emerging subject, prompt us to re-examine our fundamental existential concepts.

A related concept is “the singularity,” the predicted point at which computerized robot intelligence overtakes human intelligence, which according to some will quickly bring about the extinction of the human species, perhaps within the current century (e.g., Barrat 2013; Bostrom 2014; Del Monte 2013; Kurzweil 1999, 2006). Developments pursuing Artificial General Intelligence (AGI), the point at which artificial intelligence (AI) equals human intelligence, is a key goal in the advance of robotics. After that point is reached, the singularity scenario holds that robots, unhampered by biological evolution, would increase in intelligence and strength at an exponential rate leaving us far behind (Barrat 2013).

One human response may be to become cyborgs. Cyborgs (cybernetic organisms) are machine-like humans. Although others described the concept earlier (see Gray, Mentor, and Figueras-Sarriera 1995), the term was coined by Clynnes and Kline (1960) to refer to internal and external bodily modifications needed for a human to survive in space. They began their article by saying that “Space travel challenges mankind not only technologically but also spiritually, in that it invites man to take an active part in his own biological evolution” (26). Norbert Wiener (1948/1965) announced that “We have decided to call the entire field of control and communication theory, whether in the machine or in the animal, by the name of cybernetics....” (11). Recent developments have shifted cybernetics from robots to cyborgs with such as human enhancements as auto-adjusting pacemakers, insulin pumps, and brain-controlled prosthetics. Today its increasing applicability to both entities is one indication of the growing convergence of the two figures. But a basic difference remains: cyborgs are augmented or modified organisms while robots are cybernetic machines.

The figure of the cyborg was brought to prominence by Donna Haraway’s (1985) “A Manifesto for Cyborgs,” and especially in its reproduction as a chapter, in her book Simians, Cyborgs, and Women (Haraway 1991). Although Haraway defines the cyborg as “a hybrid of machine and organism,” she also notes that it is “a creature of social reality as well as a creature of fiction” (149). She was more concerned with using the cyborg as a metaphor than a material reality (Best and Kellner 2001; Ranisch and Sorgner 2014). As a metaphorical boundary-straddler, the cyborg that Haraway celebrates is one that collapses dualisms such as “self/other, mind/body, culture/nature,
male/female, civilized/primitive, reality/appearance, whole/part, agent/resource, maker/made, active/passive, right/wrong, truth/illusion, total/partial, God/man” (Kang 2011, 304). Based on a netnographic study, Bhattacharyya and Kedzior (2012) find three threats posed by cyborg technology: humans giving up control to technology; humans using cyborg technology to control other humans; and humans losing the essence of being human by becoming cyborgs. As Robots threaten to gain a soul, humans may be threatened with losing ours.

In assessing such possibilities, I outline questions for consumer research. Key consumer issues involve identity, intimate relations between humans and artificially intelligent robots, interspecies acceptance and trust, and safety and morality. I provide a conceptual understanding of these developments and urge consumer research to address this agenda of issues.

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