

Materializing digital collecting: An extended view of digital materiality

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Abstract

If digital objects are abundant and ubiquitous, why should consumers pay for, much less collect them? The qualities of digital code present numerous challenges for collecting, yet digital collecting can and does occur. We explore the role of companies in constructing digital consumption objects that encourage and support collecting behaviours, identifying material configuration techniques that materialize these objects as elusive and authentic. Such techniques, we argue, may facilitate those pleasures of collecting otherwise absent in the digital realm. We extend theories of collecting by highlighting the role of objects and the companies that construct them in materializing digital collecting. More broadly, we extend theories of digital materiality by highlighting processes of digital material configuration that occur in the pre-objectification phase of materialization, acknowledging the role of marketing and design in shaping the qualities exhibited by digital consumption objects and, consequently, related consumption behaviours and experiences.

Keywords

Collecting, consumer–object relations, digital collecting, digital materiality, materiality

Introduction

In circumstances of scarcity and desperate desire, even normally taken-for-granted consumption objects such as air and water gain elevated importance. In the case of collections, seemingly ordinary objects such as spoons, bottle tops and beer coasters can gain special significance because of their role as part of a set of unique objects thematically encapsulated by the collection (Belk, 1995a; Pearce, 1998). What then of digital collections? Some scholars argue that digital collecting lacks many of the pleasures of collecting (Arditi, 2017; Ashman, 2013; Watkins et al., 2015), yet it

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appears that under certain conditions digital items can become highly valued, actively pursued collectibles. Consider, for instance, consumers' heated pursuit of digital Pokémon in the summer of 2016. Video footage documents hordes of Pokémon Go players chasing a rare Vaporeon character through New York's Central Park late at night, scrambling past one another to capture this desirable digital Pokémon and add it to their collection (Worley, 2016). Indeed, there are accounts of consumers trespassing upon private property in pursuit of these digital characters (BBC, 2016; Guardian, 2016). This presents just one instance in which digital consumption objects have become actively and passionately collected.

Why do some digital consumption objects facilitate pleasurable collecting experiences, yet others do not? How is the pleasure of collecting introduced in the digital realm? If we acknowledge, as marketing theory increasingly does (e.g. Borgerson, 2005, 2013; Canniford and Bajde, 2016; Epp and Price, 2010; Ferreira and Scaraboto, 2016), that objects have the capacity to influence and shape consumer-object relations, then developing an understanding of the influences that shape digital consumption objects' characteristics, and thus their agency, becomes an important task. Yet, within the field of marketing theory, research exploring digital materiality has attended primarily to the objectification phase of materialization – to the ways in which consumers experience and interact with digital possessions (e.g. Belk, 2013; Denegri-Knott et al., 2012; Kedzior, 2014; Watkins and Molesworth, 2012). In this article, we present an extended view of digital materiality, turning our attention to what Ferreira and Scaraboto (2016) term the pre-objectification phase of materialization – to the role of companies in materializing digital consumption objects. Digital code, we argue, is a material substance that can, through processes of material configuration involving marketing and design, be altered and shaped to produce digital consumption objects with varying characteristics. While the qualities of digital code as a material substance appear ill-suited to collecting, we highlight processes of material configuration that materialize digital consumption objects as elusive and authentic and, in doing so, may facilitate those pleasures of collecting otherwise absent in the digital domain. This article extends theories of collecting, which have devoted limited attention to both the materiality of the collected object in shaping collecting and the role of companies in materializing collected objects. More broadly, our analysis extends theories of digital materiality by highlighting techniques of digital material configuration that occur in the pre-objectification phase of materialization, acknowledging the role of marketing and design in shaping the qualities exhibited by digital consumption objects and the way in which consumers use and interact with these items in objectification.

We begin by reviewing existing literature on materiality and digital materiality, before proceeding to an analysis that draws on literature from a broad range of disciplines in order to explore the challenges that digital code presents for collecting and to identify the techniques of material configuration used by companies to shape the qualities of digital consumption objects and stimulate the thrills and pleasures of collecting in the digital realm.

Materiality

Theories of consumption must be underpinned by an understanding of materiality – of assumptions surrounding subjects, objects and their interrelation – because explicit articulation of such assumptions aids researchers in mapping agency within consumer-object relations (see Borgerson, 2005, 2013; Miller, 1987). Miller's (1987) theory of materiality describes a dynamic, dialectical process of objectification whereby objects are interacted with and reworked by subjects in ways that co-constitute consumers and consumption objects. A significant body of consumer research

explores the ways in which consumers' interactions with objects shape their identities (e.g. Ahuvia, 2005; Belk, 1988; Epp and Price, 2010; Fernandez and Lastovicka, 2011). However, recent re-examination of the assumptions underpinning studies of consumption has led to a recognition that consumers' agency has been privileged (Bajde, 2013; Bettany, 2007; Borgerson, 2005, 2013; Canniford and Bajde, 2016). Many recent studies of consumption have sought to make amends through an increased acknowledgement of objects and their agency (e.g. Canniford and Shankar, 2013; Epp and Price, 2010; Shove and Pantzar, 2005; Watson and Shove, 2008), often drawing from actor–network theory (Callon, 1986; Latour, 2005; Law, 2004), assemblage theory (Delanda, 2006; Deleuze and Guattari, 1988), object-oriented ontology (Harman, 2011, 2016) and theories of practice (Bourdieu, 1977; Reckwitz, 2002). Consequently the agency of objects – their capacity to act and cause an effect (Latour, 2005) – is increasingly recognized. Epp and Price (2010), for instance, propose that objects have the capacity to displace others from possession networks, while Watson and Shove (2008) highlight the delegation of competence to non-human actants in consumption practices. However, Scaraboto et al. (2016: 238) observe that 'even though objects have recently gained visibility in consumer research, we are still mostly blind to the presence and relevance of material substances in shaping consumers' social world'. To more fully understand the agency of objects in consumer–object relations, we must first deepen our understanding of objects themselves, attending to their materiality.

New materialist scholars argue that materials and objects are not fixed and static, but active and vibrant, in a constant state of becoming (Bennett, 2010; Coole and Frost, 2010; Harvey and Knox, 2014; Ingold, 2007, 2012). Ingold (2012: 435) observes that the tendency to focus on finished objects as 'a complete and final form that confronts the viewer as a *fait accompli*' may obscure the role of material substances and the way in which they are shaped in the production of a consumption object. Designers and marketers anticipate how objects will be interacted with and embed these intentions within the objects that they produce (Dant, 2008; Lalaounis, 2017). There is value, therefore, in understanding how objects are materialized and considering how their materialization shapes consumer–object relations. Building on Miller's (1987) theory of materiality, Ferreira and Scaraboto (2016: 193) propose an extended model of materialization that considers its 'pre-objectification' phase, defined as the 'process of materialization by which material substances, designer intentions, and marketing efforts are brought together to give origin to – and become – a consumption object'. Focusing their analysis on a brand of plastic shoes, Ferreira and Scaraboto (2016) demonstrate that processes of material configuration in the pre-objectification phase influence objects' material coexistence with consumers and their identity projects during the objectification phase of materialization. For instance, design and production techniques shape the way the shoe feels, looks and even the way it degrades over time through interaction. Subsequently, Scaraboto et al. (2016) have demonstrated the ways in which the material substance of the shoes influences curatorial processes in consumption, influencing the ways in which consumers wear, care for, catalogue and display their shoes and, subsequently, the shoes' relation to consumers' identities. Similarly, Gruen (2017) explores the ways in which design may shape consumer–object relations in access-based consumption, focusing on car sharing system Autolib. She concludes that through design features such as uniformity and personalization, the company is able to foster practices of appropriation among its user base. Thus, attention to techniques of material configuration in the pre-objectification phase of materialization produces new insight into the role of marketing and design influences in shaping consumer–object relations, providing a more complete view of materialization.

In this article, we turn our attention to *digital* materiality, considering the role of design and marketing influences in shaping the qualities of digital code in the production of digital consumption objects and, consequently, shaping their relation to consumers. Doing so enables us to present an extended view of digital materiality that considers both the pre-objectification and objectification phases of materialization.

Digital materiality

Marketing theorists have acknowledged that the items consumers possess increasingly take digital forms, not only digital versions of analogue media such as digital photographs, books and music recordings but also entities such as social networking profiles, text messages, blogs, mobile applications and avatars (see Belk, 2013; Denegri-Knott et al., 2012; Watkins and Molesworth, 2012). Kedzior (2014: 7) proposes that digital materiality ‘consists of intangible representations and simulations, which are usually experienced by consumers as materially mediated through their computer screens’. In a similar vein, Watkins (2015a: 5) defines digital consumption objects as ‘objects that possess no enduring material substance, but rather exist within digital space (computer-mediated electronic environments) and may be accessed and consumed via combinations of hardware (e.g. laptops, mobile phones and videogames consoles) and software (e.g. operating systems, application software)’. Such definitions acknowledge the role of tangible objects in supporting digital materiality. Indeed, while the term ‘dematerialization’ is often used to refer to the shift from physical, tangible items towards intangible digital consumption objects (e.g. Bardhi and Eckhart, 2017; Belk, 2013; Maguadda, 2011, 2012; Slater, 2002), it is broadly acknowledged that digital items are not entirely ‘immaterial’. Maguadda (2011:16), for instance, proposes that that digital music consumption ‘[does] not mean less materiality and [does] not imply a less relevant social role for material objects within consumption processes’. He concludes that ‘material “stuffs” still occupy a relevant position, and materiality seems to “bite back,” playing an even more essential role in consumer practices’ (Maguadda, 2011:16). Indeed, it is only through the combination of digital files with tangible items such as screens and speakers that digital consumption objects can be accessed, experienced and consumed (see Blanchette, 2011; Denegri-Knott and Molesworth, 2010; Kedzior, 2014; Leonardí, 2010; Pink et al., 2016; Slater, 2002; Watkins, 2015a, 2015b). Miller and Horst (2012: 25) propose that ‘The more effective the digital technology, the more we tend to lose our consciousness of the digital as a material and mechanical process, evidenced in the degree to which we become almost violently aware of such background mechanics only when they break down and fail us’.

Such discussions of digital materiality often focus upon the materiality of digital technologies and storage media. What of the materiality of the code itself? At their core, the digital items that we consume and possess consist of digital code – a series of ones and zeroes – and Blanchette (2011) argues that there is much to be learnt by approaching this code as a material object or substance. Scholars agree that digital code itself has distinct qualities – it is non-rivalrous (use by one person does not typically affect simultaneous use by others) and infinitely replicable (items can be copied limitless times at virtually no cost) (Ekbia, 2009; Kallinikos and Mariátegui, 2011; Kallinikos et al., 2013). However, while prior work in other fields has identified consistent qualities of digital *code*, the limited body of research within marketing theory that has explored the experiential qualities of digital consumption objects indicates that they may be experienced in starkly contrasting ways. While some scholars argue that digital consumption objects are valued significantly less than tangible items (Atasoy and Morewedge, 2018; Siddiqui and Turley, 2006), other research

documents special, cherished and highly valued digital possessions (Denegri-Knott et al., 2012; Watkins and Molesworth, 2012). Some scholars highlight the convenience of apparently fluid digital objects that can be stored in the cloud and accessed via multiple devices (Bardhi et al., 2012; Kedzior, 2014; Watkins, 2015a, 2015b), while others highlight limitations to consumers' ownership rights that restrict their interactions with these items and can disrupt possessory relationships (Scaraboto et al., 2013; Watkins et al., 2016).

Given such variance, it can be problematic to seek a definitive ontology of digital consumption objects or to treat all digital consumption objects as equal. As with physical materiality, digital materiality may take different forms, and there is value in attending to the ways in which digital consumption objects are materialized. Not only is an e-book, for instance, very different from an avatar, or from a digital photograph, but e-books themselves may vary significantly in the characteristics they exhibit, due to differences in their construction. Differences in the materialization of digital possession, therefore, cannot be attributed solely to the consumer and their interactions with and interpretations of the digital consumption object but may be rooted in material configuration processes that occur in the pre-objectification phase of materialization. However, largely absent from theories of digital materiality within the marketing theory is an explicit acknowledgement of marketing and design influences on digital consumption objects. Beyond acknowledging restrictions on legal ownership of these items, marketing theory has focused primarily on the objectification phase of digital materialization – the ways in which the end consumer experiences and interacts with digital consumption objects. We turn our attention to the pre-objectification phase of materialization to consider the role of companies in materializing digital consumption objects, in order to provide a more complete view of digital materiality. How might companies shape the qualities of digital consumption objects, and how might this impact consumer–object relations? To address this question, we must extend Ferreira and Scaraboto's (2016) concept of material configuration into the digital realm to unpack the construction of digital consumption objects. Exploring processes of digital material configuration enables us to account for starkly contrasting accounts of the experiential qualities of digital consumption objects in prior research and to produce an enriched understanding of digital materiality that accounts for marketing and design influences and their impact upon consumer–object relations. To focus our analysis, we consider processes of digital material configuration for a specific category of consumption behaviours that has received significant attention across a wide range of disciplines: collecting.

Materializing digital collecting

One in three consumers identify as collectors, and collecting has been found to occur in virtually all cultures and eras, and across ages and genders (Belk, 1995a; Pearce, 1998; Steketee and Frost, 2010). Collecting is defined as 'the process of actively, selectively, and passionately acquiring and possessing things removed from ordinary use and perceived as part of a set of non-identical objects or experiences' (Belk, 1995a: 479). Distinct from other sets of objects, collections are typically characterized by perceived unity (the collection is greater than the sum of its parts) and selectivity (collections have clear boundaries and duplication is avoided) and, in many cases, by non-utility (even functional items are rarely used for their intended purpose) (Belk, 1995a, 2014a; Belk et al., 1991; Pearce, 1998; van der Grijp, 2006). Collections are often consumers' most prized items, and the practice of collecting can become an important hobby, avocation and serious leisure pursuit that presents opportunities for excitement and discovery (see Belk, 1995a; Belk et al., 1991;

Gelber, 1999). While some of the items that consumers choose to collect are actively marketed as 'collectible', such as trading cards (Rogoli, 1991), toys (e.g. Beanie Babies, see Morris and Martin, 2000) and comic books (Steirer, 2014), there are no limits to what consumers may choose to collect. Scholars have considered a broad range of material collections, from high-end items such as classic cars (Dannefer, 1980) and works of art (Baekland, 1994) to seemingly worthless items such as plastic bags (Pearce, 1998) and beer cans (Soroka, 1988), and to a lesser degree the collection of non-tangible items such as experiences (Belk, 1995a; Keinan and Kivetz, 2011) and digital consumption objects (Arditi, 2017; Ashman, 2013; Watkins et al., 2015).

Theories of collecting have devoted limited attention to the role of collected objects' materiality in shaping collecting. In line with broader privileging of consumer agency in studies of consumption, theories of collecting have emphasized consumers' role in assembling, structuring, curating and dismantling collections and the relation of collections to consumers' identity projects (e.g. Belk, 1995a; Pearce, 1998). However, as noted above, recent research by Scaraboto et al. (2016) has explored the implications of the materiality of Melissa shoes as collected objects for curatorial practices in collecting, including the ways in which they are used, cared for, stored and displayed. For instance, these 'high-maintenance' shoes require specific processes of cleaning to remove stains and dirt from the plastic material, causing many collectors to limit the size of their collection. Thus, the characteristics of consumption objects have notable consequences for consumer-object relations in collecting that are little understood. Digital code, as we have previously acknowledged, has distinct material properties – what implications might these qualities have for collecting practices and experiences?

In addition to overlooking the materiality of collected objects, theories of collecting within marketing and consumer research have devoted little attention to the role of companies in materializing collecting. Scholars have acknowledged the existence of a lucrative market for 'instant collectibles' that are designed to be collected, such as baseball cards, and have observed that companies may market these items as limited editions in order to heighten their desirability (e.g. Belk, 1995a; Carey, 2008; Pearce, 1998). However, the precise ways in which companies, through design and marketing influences, may shape the materiality of consumption objects and consequently may influence collecting are little understood. In the context of digital consumption objects, the importance of addressing this theoretical limitation becomes particularly salient. Digital code as a material substance – non-rivalrous and infinitely replicable – presents new challenges for collecting. If digital objects are abundant, ubiquitous and infinitely replicable, why should consumers pay for, much less collect them? While some prior literature indicates that digital consumption objects exhibit distinct qualities that may challenge the phenomenon of collecting (e.g. Watkins et al., 2015), a broad range of digital collections have emerged, from collectible digital Pokémon to digital trading cards. Why is it that some digital consumption objects challenge collecting, yet others do not? How might companies shape the qualities of digital consumption objects and thus impact consumer-object relations in collecting?

Our analysis aims both to identify the challenges to collecting presented by the material substance of digital code and to highlight techniques of material configuration that shape the materiality of digital consumption objects in ways that may facilitate pleasurable collecting experiences. To do so, we contrast established theories of collecting with emerging accounts of digital objects, consulting literature spanning marketing and consumer research, anthropology, material culture studies, psychology, economics, media studies, computer science, information systems and game design research. We focus our analysis on two object characteristics – elusiveness (the likelihood and difficulty of acquiring an object) and authenticity (the extent to which

an object is perceived as being, or being representative of, the 'real thing' – that are closely interwoven with collecting but do not translate seamlessly into the digital realm. In illustrating our analysis we provide examples from a range of digital contexts, including digital music, e-books, virtual worlds, video games and digital trading cards. Many of the examples of material configuration techniques stem from the context of digital games and virtual worlds. This is not a coincidence but rather a reflection of the industries in which these techniques of digital material configuration are, at present, most prominent.

Object elusiveness

Notions of object elusiveness underpin theories of collecting. Collections are closely linked to feelings of mastery, competence and success, evidencing the collector's tenacity, affluence and expertise (Belk, 1995a, 1995b). Collectors enjoy both the 'thrill of the hunt' (actively pursuing rare items) and the 'thrill of the find' (unexpectedly discovering new and unusual items), as they travel to distant stores, trawl antique fairs, bargain for pieces and bid in online auctions in order to seize rare items before they are irretrievably taken by another collector (Belk, 1995a; Danet and Katriel, 1994; Hillis and Petit, 2006; Koppelman, 2008). For collectors, the process of acquiring additions to the collection is more important than possessing the collection (Shuker, 2010). Indeed, Belk (1995a) argues that the owner of a dormant collection is a curator, not a collector. Such thrilling and pleasurable experiences of acquisition involve elusive objects, whose acquisition involves a level of skill, effort, commitment and/or luck. A delay between awareness of an item and its acquisition enables desire to arise (Marshall, 2016; Reynolds, 2011). This is what Belk et al. (2003), following Simmel ([1900] 1978), refer to as distance; distance, at least up to the point that it becomes insurmountable, increases longing. The experience of coveting collectibles and striving towards their acquisition is often an important and pleasurable aspect of the collecting experience (Belk, 1995a; Danet and Katriel, 1994; Hillis and Petit, 2006; Shuker, 2010). However, to what extent do digital consumption objects exhibit the elusiveness that is apparently necessary to pleasurable collecting experiences? How might marketing and design influences materialize digital consumption objects as elusive, and what implications might such processes of digital material configuration hold for collecting?

Digital challenges to object elusiveness. Scarcity is central to object elusiveness, enabling symbolic possessions to lead to distinction and desire (Belk, 1995a, 2015; Lynn, 1992; Thierry, 1992), even if the scarcity is artificially induced (Xenos, 1989). Belk (1995a: 89) claims that 'rarity is prized because it is not enough to succeed if everyone else succeeds as well'. However, digital code can be reproduced and distributed at negligible cost, almost instantaneously (Blanchette, 2011). Due to digital code's non-rivalry in use and infinite replicability, digital consumption objects are often associated with abundance rather than rarity (Belk, 2015; Lehdonvirta and Virtanen, 2010). Lehdonvirta (2012: 20) observes that 'There are no first pressings or limited editions, no old and new copies, no second hand or new, only perfect mint. There is no scarcity: everyone can have everything'. Akin to monetary inflation resulting from an increase in the circulation of currency, if everyone has an item, then possessing it results in little prestige. A virtually limitless supply of downloadable or streamable music, films and photographs may cheapen their value not just monetarily but also symbolically, as possession of these items fails to set their possessors apart from others (Belk, 2015; Giles et al., 2007; McCourt, 2005; Styvén, 2010).

Many companies have attempted to prevent consumer copying of digital objects via digital rights management (DRM) technologies and other techniques that constrain the replicability of digital consumption objects such as digital music albums, mobile applications and e-books (see Giesler, 2008; Watkins et al., 2016). In such cases, consumers are unable to pass on their copies of these digital items to others freely, meaning that items must be purchased or acquired by each consumer independently through official channels. In doing so, these firms have been able to transform digital files into salable commodities. However, removing the replicability of digital consumption objects in isolation does not resolve the issue of abundance as a challenge to collecting when limitless quantities are available for immediate acquisition. For instance, digital music albums are never 'sold out' or 'out of stock', and we do not hear of rare, hard to come by e-books. Thus, rivalry does not always equate to scarcity.

Digital abundance is often coupled with digital ubiquity. Earlier we noted that consumers take pride in collections because they offer an opportunity to demonstrate skill, knowledge and dedication. Such symbolic meanings depend upon difficulty in acquisition; according to Belk (1995a: 69), the most desirable collectibles cannot be acquired with money alone but require the collector to be 'shrewder, quicker, more knowledgeable, more discerning, more diligent, or simply luckier than other collectors'. These symbolic meanings are challenged by the digital ubiquitousness created through online distribution methods. Prior literature acknowledges that digital objects are experienced as placeless once possessed in that they are often stored 'in the cloud' rather than on any one fixed device, accessible from any location (Odom et al., 2012, 2014; Watkins, 2015b). However, there is also placelessness to their acquisition – they are downloaded from online stores that are always open, accessible any time and anywhere (subject to some geographical limitations). For instance, although record collectors trawl record stores, flea markets, and car boot sales, discover new items while on their travels, and even travel for the sole purpose of finding new, rare items, this is not currently necessary or even possible in the context of digital music. Visiting a new location does not reveal new items. There are no rare limited editions that may be located with sufficient skill, knowledge or effort. Consequently, the skill and effort involved in acquiring physical items often does not translate into the digital space unless appropriate techniques of material configuration are implemented.

Digital abundance and ubiquity, and the resultant lack of object elusiveness, appears to inhibit the pleasurable desire that is so central to collecting. Marshall (2016: 69) argues that 'if everything was available freely then desire would fade as there would be no time lag between wanting and getting'. Where there is no distance, no delay in gratification, there is no desire (Belk et al., 2003). Prior research indicates that much of the pleasure of desiring, acquiring and possessing digital consumption objects is consequently eroded. Watkins et al. (2015) have illustrated that the thrill of the hunt (pursuing an object) and the thrill of the find (serendipitously discovering an object) that characterize collecting may be eroded by digital objects' ease of acquisition. Indeed, their findings indicate that lack of object elusiveness erodes not only the pleasures of acquisition but also the pleasure of possessing collections. Where acquisition is effortless and instantaneous, acquired digital objects fail to demonstrate collector prowess and thus to evoke feelings of pride. For instance, while one participant in Watkins et al.'s (2015) study felt great pride in his vinyl collection, because these items were difficult to obtain and incited much envy from friends and fellow collectors, he felt little pride in his digital music; his friends would not be jealous of his MP3 files because they could simply (and almost instantaneously) download their own copies. Thus, digital abundance and ubiquity appear to constrain opportunities to demonstrate skill, competence and mastery to oneself and to others, limiting the symbolic meanings that these items come to hold for consumers.

This observation may aid us in accounting, in part, for the resurgence of analogue media. The recent revival of the vinyl record market (see Bartmanski and Woodward, 2015; Maguadda, 2011; Sarpong et al., 2016) is often attributed by the mainstream media to feelings of nostalgia (amongst older generations), to 'retromania' (among younger consumers who grew up with digital media), or simply to vinyl's richer, warmer sound (e.g. Bray, 2014; Morris, 2016; Topping, 2014). However, tangible vinyl records also better facilitate the pleasurable 'thrill of the hunt' that makes collecting appealing to so many (Belk, 1995a). Indeed, Watkins et al. (2015) describe one teenager's turn to record collecting as a means to achieve something that she felt was lost in her more functional relationship with digital music; the thrill of searching car boot sales for hidden treasures was more challenging and, consequently, more pleasurable than simply searching for and downloading a digital file. The additional effort involved in assembling record collections (and in using and caring for them), which once attracted consumers to the more convenient alternatives of CDs, and later digital music, may rather ironically lie behind the vinyl market's recent 'reincarnation'.

In summary, digital code's non-rivalry and replicability, coupled with commonly used methods of distribution, render many digital consumption objects abundant and ubiquitous. Digital consumption objects' frequent lack of elusiveness appears to challenge traditional practices and experiences of collecting. While consumers may develop collections of e-books, digital music and other digital items that are characterized by selectivity and unity, the experience and practice of collecting may be starkly different. The thrill of desiring and acquiring items for the collection, the symbolic value of the collection and the collector's pride in collected items appear to be eroded where digital objects are abundant and ubiquitous. However, this is not always the case. Digital code as a material substance can be moulded by marketing and design influences and consequently digital consumption objects can be materialized as elusive.

Materially configuring object elusiveness. Processes of material configuration can introduce object elusiveness by requiring consumers to invest time and effort in their acquisition. In their work on virtual economies, Lehdonvirta and Castronova (2014) describe this as the creation of a time aristocracy (those who invest the most time acquire the best items and thus higher social status) rather than a money aristocracy (those who invest the most money acquire these items). We argue that in materially configuring digital consumption objects as elusive, companies may facilitate those pleasures of collecting that stem from object elusiveness. Companies can create time aristocracies in the context of digital consumption objects by coupling DRM techniques that prevent consumer copying with the imposition of artificial scarcity, including not only quantity-based artificial scarcity that reduces digital abundance but also techniques of time-, location- and skill-based artificial scarcity that reduce digital ubiquity by demanding commitment and effort from collectors.

In contrast to material scarcity in which demand outstrips natural supply, in the context of digital consumption objects scarcity must be artificially created (similar techniques are also used in the context of material collections in the form of 'limited editions', see Belk, 1995a). Virtual worlds and video games frequently impose quantity-based artificial scarcity by limiting the number of copies available, increasing items' rarity and elevating their perceived value (Hamari and Lehdonvirta, 2010; Lehdonvirta and Castronova, 2014). For instance, Lehdonvirta et al. (2009) describe the creation of artificial scarcity within teen virtual world Habbo Hotel, where 'collectibles' are placed on sale for limited periods of time, sometimes as briefly as 2 hours, and in limited quantities (Lehdonvirta et al., 2009). For instance, a record player (a purely aesthetic object that does not play music and has no other function) released for a short period in 2002 became highly

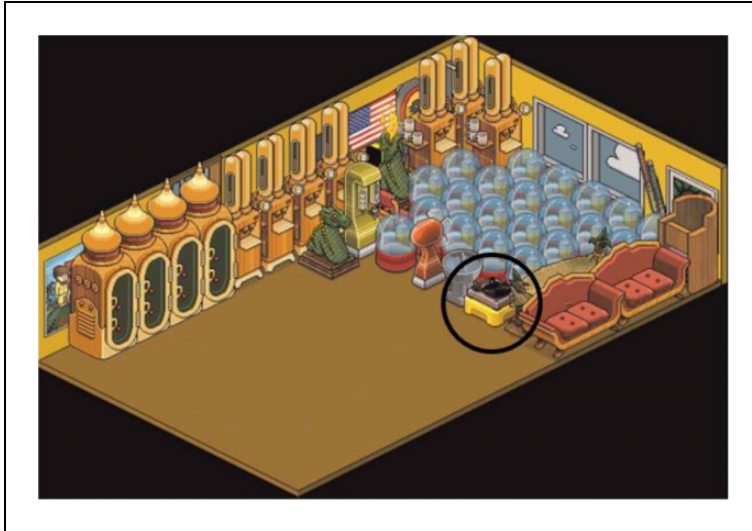


Figure 1. Collection of ‘super-rares’ and other valuable items on display in one Habbo Hotel user’s bedroom, including the much-coveted record player (circled). *Source:* Lehdonvirta et al. (2009: 1070).

sought after, with a resale value of around 250 Plastyk (digital chairs used as informal currency for bartering within Habbo Hotel) in 2006, then equivalent to approximately €200 (Lehdonvirta et al., 2009). Its rarity, artificially created by limiting sales, inflated both the monetary and symbolic value of the item, which became highly desired. Such limited editions have become known by the virtual world’s inhabitants as ‘super rares’, and their possessors are elevated in the platform’s status hierarchy. Indeed, Habbo Hotel users take such pride in the possession of super-rares that collections of these items are often displayed prominently to other users (see Figure 1).

Here, we see an illustration of the way in which the scarcity inherently absent in the context of infinitely reproducible and non-rivalrous digital code is materially configured in the production of digital consumption objects. Materializing an item as elusive has consequences for the ways in which consumers interact with, experience and value the item. If everyone cannot have a digital object, the item may gain symbolic value and serve to differentiate collectors. The role of artificial scarcity in elevating the record player’s monetary and symbolic value is particularly apparent in this instance since a re-release of the item in mid-2006 notably decreased both its rarity and its associated prestige (Lehdonvirta et al., 2009). The imposition of artificial scarcity is not always a deliberate attempt by marketers to create rare and desirable collectibles. For instance, the developers of video game *Ultima Online* created a small amount of digital horse dung to add ambiance to the stables within the game world; however, because the digital horses were not designed to produce further dung, the supply was limited to approximately one piece per 30,000 players (Lehdonvirta and Castronova, 2014). Due to the rarity of this functionless dung, an item that was never intended by designers to hold any in-game value, or indeed even to be acquired by users, became a status symbol within the game, traded for large quantities of in-game currency, envied by others and often displayed with intense pride (Lehdonvirta and Castronova, 2014). Again, quantity-based artificial scarcity, in this instance unintentionally, materialized the digital consumption object as elusive and thus as desirable and valuable.

Quantity-based artificial scarcity is also used by Topps in the marketing of digital trading cards. Topps has sold physical trading cards since the 1950s and has more recently launched digital applications that enable collectors to purchase and trade digital cards relating to themes such as baseball, American football and Star Wars. Cards are sold in limited quantities, similarly to their physical equivalents, and it is possible for users to see how many versions of each card are available and thus to judge their scarcity and worth (Ulanoff, 2015). Limited digital editions can sell out in less than an hour (BuntManFiftyOne, 2015), and the company's use of quantity-based artificial scarcity fuels a thriving second-hand market for these cards not only on Topps' own trading site but also on auction site eBay where cards are exchanged for offline currency (BuntManFiftyOne, 2015; Cook, 2016; Lussier, 2015). While non-collectors might be baffled at the prospect of spending money on these digital cards, to digital trading card collector Germain Lussier (2015), these items are highly desirable:

Would you spend almost \$225 for a single digital image of Han Solo from the original *Star Wars*? For most people, the answer is obviously 'No'. But many of us who are using the app *Star Wars: Card Trader*, from Topps, would kill to have that singular image in our collections. And some people will pay dearly for it.

Lussier could easily Google digital images of Han Solo or Boba Fett and see them on the same mobile device that he uses to access the Topps application; however, he argues that 'Actually owning that card far outweighs the joy from just viewing it'. Here, as in Habbo Hotel and Ultima Online, we see the emergence of rare and desirable items with both symbolic and monetary value.

There is a second process of artificial scarcity evident in the case of Topps trading cards, beyond limiting the overall number of digital objects sold – time-based artificial scarcity. Topps trading cards implements limited time releases whereby, without prior warning, cards are made available to purchase only within a set time frame. These limited editions appear at unannounced times, and therefore constant vigil is necessary for those who hope to acquire them. Through time-based artificial scarcity mechanisms, Topps favours those who diligently monitor trading card applications, investing time and effort in their collections. Lussier (2015) often schedules his day around acquiring cards and admits 'One time I forgot my phone and I called my mom from another phone to grab my phone and open packs for me'. Thus, Topps has not only increased the rarity of these digital cards but has brought back some of the thrill of the chase to collecting in a digital world through such limited time releases that require commitment and skill and also facilitate the simple luck of being in the right place at the right time. Through techniques of quantity- and time-based artificial scarcity, Topps have established a lucrative market for these digital cards, valued at \$329 million in 2015 (Cook, 2016).

Companies may also employ location-based artificial scarcity. The Pokémon Go augmented reality collecting phenomenon demonstrates that besides limited edition time-induced scarcity, limited locational availability can also create greater challenges in acquiring digital consumption objects. The Pokémon Go mobile application uses what Scholz and Smith (2016) refer to as a 'geolayer' approach to augmented reality, which involves augmenting the space around the user with digital objects linked to a specific geolocation. While Scholz and Smith (2016) consider the use of augmented reality in relation to marketing campaigns more broadly, here we highlight the role of geolayer augmented reality in transforming consumers' relationships with digital consumption objects. Since Pokémon (and other in-game items) are scattered across the 'real' world, they are not immediately downloadable from the comfort of consumers' homes but must be hunted

for, typically by walking around their surrounding area. While this seems highly inconvenient in comparison with other digital games that have previously filled consumers' leisure time, Pokémon Go (and, to a lesser degree, other location-based and augmented reality games and applications) has experienced phenomenal success – following its peak in the summer of 2016, the game retains 65 million active users worldwide (Weinberger, 2017). The key to this success, we argue, is the time aristocracy embedded within the game through location-based artificial scarcity. Although consumers can buy additional items via Pokécoins purchased with 'real' currency (100 Pokécoins = 0.79GBP), the game does not allow users to simply buy Pokémon. Thus, although investing money in the game may potentially accelerate a player's progression, it is not possible to 'catch 'em all' without investing significant time, geographic mobility and effort in the game. Such location-based scarcity can introduce the thrill of hunting for objects to the digital realm. The consequences of location-based artificial scarcity for digital collecting are illustrated by O'Hara et al. (2007) who designed and trialled a location-based digital collecting mobile application at a London zoo, in which children used a mobile camera phone to collect digital content (animal images, sounds and facts) via scannable tangible barcodes located at various animal enclosures. Their participants described a sense of pleasurable competition as they sought to complete their collection before their friends, while participants also appeared to take pride in showing their digital collections to others.

Finally, companies may employ skill-based scarcity. If we again consider the example of Pokémon Go, we see that it is not enough to be in the right place at the right time. The user must then use his/her skills to catch the Pokémon. This involves deciding whether to feed the Pokémon a berry (different berries have different effects on the Pokémon, making them easier to catch), choosing a Pokéball (four types are available, with some more powerful than others) taking aim and throwing a Pokéball by flicking a finger across the screen. Users can miss their target. Even if the ball hits the target, the Pokémon may escape from the ball. The Pokémon may run away before the user is able to capture it. Here, the Pokémon elude capture by demanding a level of consumer skill. In other games, such as first-person shooter game Call of Duty, the user must have achieved a certain skill level before he/she can unlock desirable items (e.g. top-of-the-range weapons) for acquisition, making these items more exclusive and a mark of the gamer's skill. In other games, such as Borderlands 2, the rarest items (in this case 'legendary weapons') are obtained only when the player defeats a 'boss' (a high ranking in-game opponent). Prior research on digital in-game collectibles within the field of human-computer interaction indicates that items that require such skill to obtain are more highly valued by consumers. Toups et al. (2016: 281) report that gamers value rare items because they are difficult to obtain; their participants valued weapons most highly when they were gained through 'defeating optional bosses and completing side-quests' because 'collecting these objects required optional play beyond what is expected of the average player', while others valued digital trading cards that were 'harder to obtain, and signal to others that the player was willing to dedicate time (or money) to acquiring rarer cards'. Similarly, Watkins et al. (2015) describe one participant's pride in his 'unbeatable' car collection within a racing video game. These cars are not immediately obtainable but must be worked towards by winning multiple races in order to gain the in-game currency necessary to buy and modify cars. Consequently 'owning' a garage full of high spec, highly desirable cars demonstrates both the gamer's skill and the hard work invested in the game over a series of months and even years. Thus, offering objects that require additional skill and effort to acquire enables collectors to distinguish themselves from others, and consequently, consumers appear to value these items more highly and to take greater pride in possessing them. Yet outside of video games skill-based scarcity is rarely employed.

There are always those who attempt to subvert time aristocracies created via artificial scarcity techniques. In the context of Topps trading cards, those with money can go to auction sites such as eBay to acquire cards that otherwise elude them (Lussier, 2015), while black market sale of Pokémon Go accounts has been documented, despite the company's attempts to prevent such activity (e.g. Gibbs, 2016; Molloy, 2016). However, the above examples illustrate the role of artificial scarcity as a technique of material configuration that can enhance the pleasures of desiring and acquiring digital consumption objects, the symbolic value of collections, and the collector's pride in possessing them.

Object authenticity

A second object quality closely interwoven with theories of collecting is authenticity. The word 'authentic' is typically used to describe something that is perceived as 'the real thing', or 'the original', as opposed to a copy or imitation (Grayson and Martinec, 2004; Peirce, 1998). Grayson and Martinec (2004) propose that both iconic and indexical cues can influence perceptions of objects' authenticity. Objects are indexical when they carry factual spatiotemporal associations with and thus signify, people, places, times and events (Grayson and Martinec, 2004; Grayson and Schulman, 2000). Often such items are valued for their auratic indexicality – through their spatial proximity to persons, places and events, they become contaminated with their aura (Benjamin, [1936] 1968). Such items come to be perceived as unique and irreplaceable; identical replicas of indexical objects would not hold the same meaning because they would fail to exhibit aura and contagion (Benjamin, [1936] 1968; Grayson and Martinec, 2004; Grayson and Schulman, 2000). Indexicality, and especially auratic indexicality, is central to many accounts of collecting. Collections of indexical objects may provide linkages to other places, times and people (e.g. collections of antique objects or items owned by or associated with celebrities) (Belk, 1995a; Fernandez and Lastovicka, 2011; Freund, 1993; Newman et al., 2011). Furthermore, collected objects can help narrate and memorialize collectors' own lives as they remember when, where and with whom each piece was acquired (e.g. a collection of fridge magnets from every travel destination) (Ahuvia, 2005; Belk et al., 1991; Benjamin, [1930] 1968; Gregson, 2007). Indeed Beer (2008: 756) proposes that 'collecting is the accumulation of a form of material biography that reveals things about us, about our life trajectories and histories, and about the social and cultural movements, moments and events that we have lived through or that we find connection with'. In addition to the indexical cues more commonly discussed in the collecting literature, objects' perceived authenticity may also be rooted in iconic cues, where an object's 'physical manifestation resembles something that is indexically authentic' (Grayson and Martinec, 2004:298); it is true to the original. This might include, for instance, a replica of an idol's guitar (Fernandez and Lastovicka, 2011), photographs of indexical objects (Lastovicka and Fernandez, 2005) or replicas of antiques (Grayson and Martinec, 2004). While indexicality is more desirable to consumers when it comes to possessing or collecting authentic objects, iconicity is a desirable alternative when indexical objects are unobtainable (Fernandez and Lastovicka, 2011). To what extent do notions of object authenticity translate into digital collecting? Can digital consumption objects hold indexical or iconic cues? How might such forms of authenticity be materially configured, and how might this shape collecting behaviours and experiences?

Digital challenges to object authenticity. The qualities of digital code present a number of challenges to object authenticity, in particular to the indexicality that is so desirable in collecting.

Scholars have acknowledged, for instance, the impact of digital objects' intangibility. Consumer research has documented processes of collecting tangible items with the provenance of having once been owned by prominent others, such as portraits of aristocrats, clothing worn by celebrities or the guitars of favourite musicians, with the hope that some essence will 'magically rub off' and expand the collector's identity (Belk, 1995a; Fernandez and Lastovicka, 2011; Steketee and Frost, 2010: 46). However, Belk (2013) notes that digital possessions lack the tactile nature that allows material possessions to absorb part of the soul or essence of the person, which is seen to rub off on or 'contaminate' the object through physical proximity (Belk, 1988; Benjamin, [1936] 1968). Thus, their capacity for auratic indexicality is questionable. Beyond their intangibility, however, we observe further challenges that digital code presents for indexicality.

First, the non-rivalrous, infinitely replicable nature of digital code presents challenges to the notion of a singular object biography, from which indexical meanings stem. Studies of collecting, and possession more broadly, are rooted in the assumption of singular, distinct objects that can be traced along a single object 'biography' (Kopytoff, 1986) as they are acquired, singularized, decommodified, passed on, resold and so on (e.g. Curasi et al., 2004; Epp and Price, 2010; Lastovicka and Fernandez, 2005). It is the object's distinct history that imbues it with indexical meanings as the item becomes associated with people, places, events, and past selves (Belk, 1990; Grayson and Schulman, 2000). However, in contrast to a singular material item changing hands, passing on a digital object generally involves creating a new copy of that digital object – duplication as opposed to transfer. Although previously mentioned techniques such as DRM may be utilized to prevent such duplication by constructing digital consumption objects as rivalrous and non-replicable, in such cases movement between consumers is often constrained by company-imposed restrictions on consumers' use of these items (see Watkins et al., 2016). Consequently, the types of movements between consumers that facilitate interesting and meaningful biographies (e.g. bequeathal, gifting and resale) are unlikely to occur (see Watkins et al., 2016). Here, mechanisms used to curb digital abundance may also constrain practices that might otherwise have contributed to the indexicality of digital collections.

Finally, digital code's durability in comparison with other material substances affects the extent to which these digital consumption objects display traces of their histories, distinguishing them from other similar objects. Patina is defined by McCracken (1988: 32) as 'the small signs of age that accumulate on the surface of objects'. Patina singularizes objects in a collection; the idiosyncrasy of a scratched record, the marginal notes in a book and the writing on the back of a photograph all support indexicality by evidencing the object's history. However, digital objects lack perishability in that they do not typically erode in use (Blanchette, 2011; Mayer-Schönberger, 2009). They do, of course, have a unique fragility of their own; digital files can be corrupted, storage media may crash, and access may be discontinued by the platforms and software through which they are accessed. In this sense, Harman (2016: 50) is right that all objects have a life and death. However, deterioration of code in use is negligible and typically not perceived by the consumer. The pages of e-books, for instance, do not yellow with age or accumulate dust, nor do their covers fade in the sunlight, and thus while personal history may develop between consumers and e-book stories and content, the e-books themselves may not show perceivable signs of this history. Belk (2014b: 251) notes that 'the soiled vinyl album cover and the particular hisses and pops in the recording personalise the listening experience; something that cannot be duplicated in a CD or MP3 file'. McCourt (2005: 250) observes that 'through their immateriality, digital files cannot contain their own history [...] No history is encoded on their surfaces, since they have no surfaces'. Thus, even where digital consumption objects follow a singular biography, they may not

show perceivable traces of this biography that would distinguish them from other copies and enable them to perform the evidentiary function of indexical objects. Consequently, just as Walter Benjamin ([1930] 1968) expressed concerns that mass-reproduction techniques such as lithography, photography and film would reduce the aura of the original, Belk (2014b: 252) proposes that in an era of infinitely replicable digital code ‘we may be losing feelings of the authenticity and the aura and authority of the original’.

Thus, the concept of an irreplaceable consumption object holding indexical meanings becomes problematic as we enter the digital realm, challenged by the qualities of digital code – not only does its intangibility challenge notions of contagion and aura, but its non-rivalry and replicability challenges the notion of object biographies and its durability challenges notions of patina. Consequently, it appears likely that many digital collections will not hold the same indexical meanings for consumers as the physical collections documented in prior studies. However, this is not always the case; as with elusiveness, companies may materially configure digital consumption objects to facilitate indexicality.

Materially configuring object authenticity. Various techniques of material configuration serve to materialize digital consumption objects as indexical, including mechanisms of object circulation that enable singular object biographies to unfold, location- and time-based artificial scarcity that facilitate spatiotemporal linkages and automated digital patina that inscribes digital consumption objects with traces of their histories that verify their indexical meanings.

First, mechanisms of object circulation enable singular biographies to unfold for digital consumption objects as they are transferred between consumers rather than duplicated. Video games are one context in which transfer mechanisms are regularly implemented, enabling not only trading, gifting and resale in-game but also the formation of secondary markets where digital objects are exchanged for ‘real-world’ money (see Lehdonvirta and Castronova, 2014). Object circulation not only creates virtual economies but also facilitates indexical meanings. Consumers describe digital consumption objects received as gifts, for instance, that are experienced as irreplaceable (Odom et al., 2011; Watkins and Molesworth 2012). Watkins and Molesworth (2012: 162) document one World of Warcraft player’s account of a gifted piece of armour:

Most things, I wouldn’t be that upset if I lost [them] because I could just buy them again. But with the gifts, it would never be quite the same because she [the participant’s friend, the gift-giver] wouldn’t have bought it, and I would know that.

Here, the item is experienced as unique and irreplaceable due to its distinct biography – a replacement would not be associated with the gift-giver and thus would lack the indexical meanings that make the original unique. Even though the gift-giver has not touched the object, which shows no perceivable traces of its provenance, it still carries the contagious magic of having been selected and transferred by the giver as a gift. Through mirroring the singular biographies of material objects, it appears that indexical meanings can be supported.

Objects hold greater potential for indexicality where the traces of these object biographies become inscribed in the objects themselves. While many material objects gain traces of object history in use, in the context of digital objects, this patina must be introduced by design. Scholars have previously discussed the ways in which consumers customize digital objects via ‘digital patina’ in the form of metadata (data associated with a particular digital file), such as personalized music playlists with customized album covers, music collections with custom categories and



Figure 2. Acquisition metadata (circled) as digital patina in Pokémon Go.

digital photo albums annotated by user comments (Odom et al., 2011). This type of digital patina marks digital possessions as unique and distinct from other copies. While existing literature documents instances of consumers actively adding digital patina to digital consumption objects, it is also possible for firms to design for indexicality by enabling digital possessions to become marked automatically with traces of user histories. Apple's iPhoto, for example, allows automatic tagging of people and places using facial recognition and GPS information (Petrelli and Whittaker, 2010). Such automated digital patina facilitates indexicality, verifying linkages with people, places and times. For instance, Lehdonvirta et al. (2009) describe a decorative digital trophy originally given as a prize to a 'celebrity' avatar within Habbo Hotel and thus inscribed with this well-known avatar's username, which was highly desirable once it entered the second-hand market, akin to celebrity collectibles documented in the material realm. Thus, while contagion through physical proximity and the resultant auratic indexicality (Benjamin, [1936] 1968) can be challenged by digital consumption objects' intangibility, here indexicality is introduced through digital patina as digital items exhibit clear marks of their provenance (Grayson and Martinec, 2004; Peirce, 1998).

Digital patina may also serve to verify spatiotemporal links that are facilitated by the techniques of location- and time-based scarcity discussed previously. Consider, for instance, Pokémon Go. Because these Pokémon are not ubiquitous, their acquisition is linked to a specific geographic location. Pokémon Go annotates each digital character with the date and city of its acquisition, verifying its provenance (see Figure 2), and therefore each digital Pokémon has a factual, spatiotemporal link to the place that it was caught. This automated and lasting digital patina distinguishes otherwise identical replicas. Consequently, consumers might choose to collect Pokémon from visited cities, as they might fridge magnets – an element of indexicality is introduced in the

digital realm. Time-based scarcity may serve to further differentiate these items. For instance, Pokémon Go introduced the ‘ash hat Pikachu’ (pictured, Figure 2) to celebrate the game’s first anniversary, available to catch for only a 2-week period. Thus, not only is the Pokémon marked with the date of its acquisition but since the item was only available for acquisition for a set period it becomes associated with a specific period in the game’s history. It is too soon to know whether consumers will value this type of indexical cue; however, it is through such mechanisms that the possibility of authentic digital antiques becomes possible.

Thus, while the qualities of digital code do not appear to support the indexicality that is central to the perceived value of many tangible collections, we argue that techniques of material configuration may alter the qualities of digital consumption objects in ways that better support such indexicality, potentially enhancing the perceived value of digital collectibles.

Where indexicality is not possible, companies may alternatively materialize digital consumption objects as iconic replicas of indexical objects. Topps digital trading cards once again present a useful example. Topps has launched several digital trading cards that we might class as iconic, including signed digital trading cards (Topps, 2017). These signed cards are not auratically indexical in that the digital file that they download has not been in spatial proximity to the celebrity, and indeed, we might argue that even the ‘original’ signed version may lack the aura of a signed physical card due to its intangibility. However, such ‘signatures’ (these signed digital cards) are consistently the most popular items because ‘autographs are unique’ (BuntManFiftyone, 2015). They may not be auratically indexical; however, they are authentic in that they are true to the original signature – they are iconic. Similarly, Topps sells digital copies of rare vintage physical trading cards that are highly desirable. The digital representations of the vintage trading cards from the original *Star Wars* movie were created using ‘industrial grade high-quality scanners to scan the actual physical artifact from the Topps archives’ (Ulanoff, 2015). Although indexicality as a form of authenticity becomes challenging in the context of digital code, requiring various processes of material configuration, it may be easier to produce iconic items in the digital realm due to the replicability of code which may enable firms to easily create digital replicas of indexical tangible items such as first edition books, vintage music recordings and even artworks that are true to the original.

Conclusions

Despite recent attention within marketing research to consumption objects and the role of marketing and design influences in shaping their qualities (Ferreira and Scaraboto, 2016; Lalaousis, 2017), prior accounts of digital materiality within marketing theory do not adequately account for the role of such influences. While computer code itself has distinct qualities (Ekbria, 2009; Kallinikos and Mariátegui 2011; Kallinikos et al., 2013), we argue that digital consumption objects vary significantly in the characteristics that they exhibit and in their relation to consumers. Consequently, rather than seeking a definitive ontology of digital consumption objects, we account for such variation by acknowledging the role of companies in shaping the characteristics that they exhibit. Identifying specific processes of material configuration enables us to better understand why some digital consumption objects are experienced as highly desirable collectibles while others fail to incite desire, pride and other important elements of collecting as previously theorized. Specifically, our analysis demonstrates that while the qualities of digital code can challenge notions of object authenticity and elusiveness, processes of material configuration can drastically shape digital consumption objects’ characteristics and consequently collecting behaviours and experiences (as summarized in Figure 3).

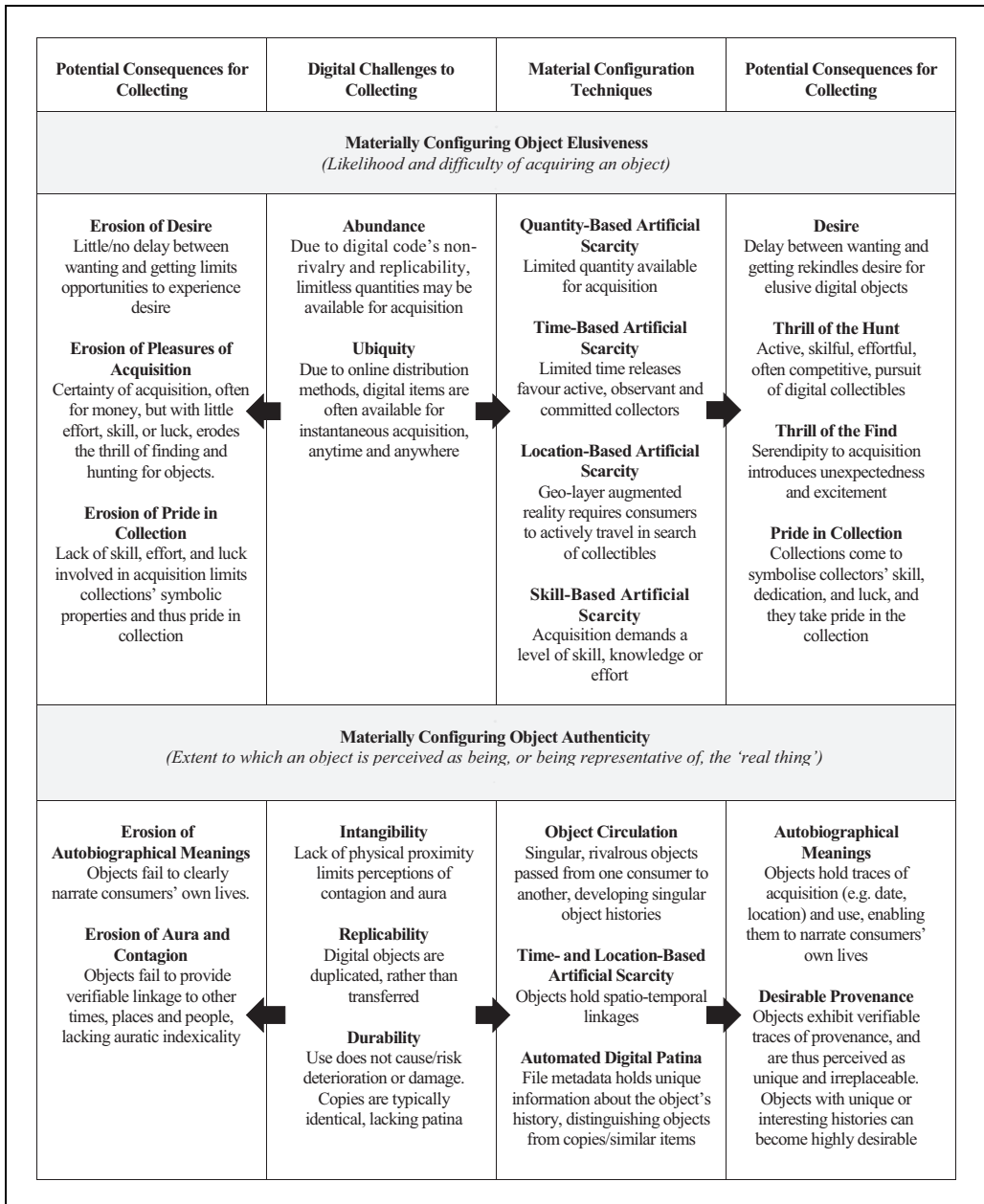


Figure 3. Materializing digital collecting

In the case of object elusiveness, digital code's non-rivalry and replicability can lead to the production of abundant and ubiquitous digital consumption objects that diminish the traditional pleasures of collecting. The pleasure of desiring, hunting and discovering new items, and the pride taken in their eventual acquisition, appears to be drastically reduced in such circumstances. This is

not to say that consumers do not perceive acquired digital items as a part of collections characterised by selectivity and perceived unity (although rarely by non-utility given their non-erosion in use), or that collectors do not take pleasure in such digital collections for other reasons. However, the pleasure of acquisition prominent in prior accounts of collecting (e.g. Belk, 1995a; Hillis and Petit, 2006; Shuker, 2010) appears in such cases to be diminished. We identify techniques of material configuration that increase digital consumption objects' elusiveness, as artificial scarcity is created not only by limiting object availability, but also through employing techniques of time-, location-, and skill-based artificial scarcity that are not well documented in the digital realm. Here the pleasures of desiring and acquiring are successfully introduced through marketing and design influences that require consumers to invest time and effort in acquisition and create an element of chance and serendipity. The pleasure and pride taken in possessing the collection also appears to be elevated, as elusive digital collectibles symbolize collectors' knowledge, skill, commitment and luck.

Similarly, in the context of object authenticity, digital code's replicability, durability and intangibility can inhibit the formation of indexical meanings. This is not to say that digital consumption objects cannot hold indexical meanings – prior research indicates otherwise (e.g. Odom et al., 2011; Watkins and Molesworth, 2012; Wang et al., 2009) – however, the qualities of digital code certainly do not support the formation of such meanings. However, our analysis identifies techniques of material configuration that better facilitate indexicality in the context of digital consumption objects, as mechanisms of object circulation enable singular object biographies to unfold, location- and time-based scarcity provide factual spatiotemporal linkages, and automated digital patina inscribes digital objects with traces of their biographies, marking them as distinct. Where these techniques are implemented, we have observed the potential for digital collectibles that hold autobiographical meanings for collectors and that become desirable as they are imbued with unique indexical associations. Auratic indexicality as discussed by Benjamin ([1936] 1968) may not be created, however verifiable marks of provenance (as discussed by Grayson and Martinec, 2004) produce a form of indexicality that nonetheless appears to be valued, enabling collected objects to narrate consumers' own lives and also potentially enabling digital consumption objects to become desirable for their provenance (e.g. their age or past owners). Furthermore, we have noted that while indexical authenticity is challenged by digital code, iconicity may be more easily achieved in the digital realm due to code's replicability.

Our analysis presents useful extensions to established theories of collecting. Our intention is not to define the limits of digital collecting – we acknowledge that consumers may choose to collect a wide range of digital consumption objects beyond those discussed here and that digital collecting may take place and be experienced in a variety of ways. Rather, we extend theories of collecting by providing new insights into the role of both objects and the companies that construct them in materializing collecting. Our analysis contributes to recent acknowledgement of the role of objects and their materiality in shaping collecting – whereas Scaraboto et al. (2016) consider the implications of objects' materiality for curatorial practices in collecting, we consider more broadly how objects may shape the practice and experience of acquiring and possessing these items and the meanings they come to hold for consumers. In doing so, we support arguments that attending to the materiality of objects provides new insight into their agency (Ferreira and Scaraboto, 2016); the materiality of objects may invite, support or discourage collecting behaviours and dictate or shape the way in which collecting can occur. Furthermore, our analysis highlights the ways in which companies shape the materiality of these objects and, in doing so, play an important role in materializing collecting. Despite disparagement of 'orchestrated collectibles' purpose-made by the

manufacturer for collecting, earlier scholarship provides only limited insight into practices of orchestration from a marketing perspective (see Belk, 1995a; Martin, 1999; Okazaki and Johnson, 2011; Slater, 2000; Steirer, 2014). Extending Ferreira and Scaraboto's (2016) recent theorization of pre-objectification into the digital realm, our analysis illustrates that marketing and design techniques enable digital consumption objects to be constructed as elusive and authentic, potentially reintroducing the pleasures of collecting that are otherwise lost with digitization. We acknowledge that processes of material configuration are also involved in the construction of material collectibles, though they are not well documented. However, we note that distinct processes of material configuration become necessary because digital code, like all material substances, has distinct qualities that necessitate new techniques. Our work highlights a need to better understand the role of companies in materializing collecting in other contexts; what techniques of material configuration are employed in the construction of the broad range of tangible consumption objects that consumers choose to collect, and how do they shape the ways in which consumers collect and take pleasure in collecting?

More broadly, the notion of material configuration provides a useful lens for approaching digital materiality beyond the context of collecting. The extended view of digital materiality presented in this article enables us to account for and explore the broad array of characteristics that digital consumption objects exhibit and the significant variations in the way that they are experienced. Despite growing attention to the qualities of digital materiality (Kedzior, 2014; Odom et al., 2011), the role of companies in shaping the qualities of digital consumption objects, and thus their relation to consumers, has received little theoretical attention within marketing theory. It is apparent from our analysis that, as with physical objects, marketing and design processes play an important role in shaping the characteristics of digital consumption objects, often drastically altering the qualities of the substance of digital code. Indeed, despite a tendency to contrast digital consumption objects with tangible items (e.g. Asatoy and Morewedge, 2018; Denegri-Knott and Molesworth, 2010; Kedzior, 2014; Watkins and Molesworth, 2012), here, we see that the extent to which digital materiality resembles physical materiality is dependent to a large extent upon the way in which it is materialized. Furthermore, despite a temptation to see digital objects as prime candidates for access-based consumption and liquid detached relations (Bardhi, et al., 2012; Bardhi and Eckhardt, 2012, 2017; Chen 2009), here, we illustrate that through processes of digital material configuration some companies are able to incite consumers to relate to digital objects from an ownership mode of consumption; regardless of legal ownership, it is apparent that consumers desire to acquire, possess and control many of the digital collectibles discussed. Thus, techniques of digital material configuration have significant yet little understood implications for digital consumption objects and their relation to consumers. In particular, we propose that such processes may shape the meaning and value that consumers attribute to digital consumption objects. For this reason, we are critical of broad claims that digital objects are valued less than physical items (e.g. Asatoy and Morewedge, 2018; Siddiqui and Turley, 2006), since the way in which consumers interact with and experience both physical and digital items depends in a large part upon the way in which these objects are materialized, which includes the often overlooked pre-objectification phase of materialization. Our analysis provides a useful framework from which researchers can draw in further exploring the various forms of digital materiality with which consumers interact on an increasingly frequent basis and, in particular, in understanding variations in the ways in which digital consumption objects are materialized.

Finally, while we are concerned in this article with theoretical rather than managerial implications, we present the construction of digital consumption objects as an important yet much

neglected theoretical area for marketing research and practice. While the marketing literature has presented managerial implications for a range of digital marketing topics such as social media marketing, digital advertising, e-commerce, website design and mobile marketing, managerial recommendations for the effective design of digital commodities are largely limited to discussions surrounding the prevention of piracy. Indeed, while recent years have seen increasing discussion of digital objects as commodities and as possessions (e.g. Belk, 2013; Lehdonvirta et al., 2009; Watkins and Molesworth, 2012), including more critical accounts of their implications for consumers (Belk, 2014c; Molesworth et al., 2016; Scaraboto et al., 2013; Watkins et al., 2016), the multitude of marketing and design issues revolving around these entities have largely escaped discussion within marketing theory. Our analysis highlights the value that lies in configuring digital materiality in ways that shape consumer–object relations, yet the use of such techniques of material configuration is limited within many digital markets. Indeed, while these techniques are commonplace in gaming markets, other industries have devoted limited attention to digital commodity design. When digitizing objects, the focus is often on efficiency and usability; however, it has been argued in other fields that marketers and designers should design digital objects in ways that support relationships, memories, reflection and the formation of emotional bonds (Golsteijn et al., 2012; Light and Petrelli, 2014). We invite marketing scholars to pursue managerially oriented studies of digital consumption objects and processes of material configuration.

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