"I wouldn't choose that key ring; it's not me": A Design Study of Cherished Possessions and the Self

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ABSTRACT
We each possess certain objects that are dear to us for a variety of reasons. They can be sentimental to us, bring us delight through their use or empower us. Throughout our lives, we use these cherished possessions to reaffirm who we are, who we were and who we wish to become. To explore this, we conducted a design study that asked ten participants to consider their emotional attachment towards and the identity-relevance of cherished and newly introduced possessions. Participants were then asked to elaborate on their responses in interviews. Through a thematic analysis of these responses, we found that the emotional significance of possessions was reportedly influenced by both their relevance to selfhood and position within a life story. We use these findings to discuss how the design of new products and systems can promote emotional attachment by holding a multitude of emotionally significant meanings to their owners.

Author Keywords
Cherished possessions; design research; self-identity; emotional attachment

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
We accumulate and discard countless possessions throughout our lives, however only a select few impart a profound lasting impression. We become emotionally attached to these possessions for the memories imbedded within them, the pleasure they provide through their use or the self-expressive opportunities they offer. These cherished possessions can reaffirm who we are, who we were and who we wish to become.

Design and emotional significance has recently received greater attention within the HCI community with several

studies focusing on objects as memory cues (Kirk & Sellen, 2010; Petrelli et al., 2008), the varying strength of attachment to different objects (Odom et al., 2009) and the emotional significance of certain digital objects (Belk, 2013; Denegri-Knott et al., 2012; Kirk & Sellen, 2010; Odom et al., 2014).

This paper explores the relationship between self-identity and emotional attachment to possessions, considering the role that each plays on the on-going development of the other. We devised and then employed a design study that explores the rationale behind people's emotional attachment to certain possessions and the varying roles that these possessions play throughout the development of people's multi-faceted identities. In doing so, we aim to expand upon previous studies exploration of how the design of new products and systems can promote emotional attachment by focusing on self-identity and its notable role in the formation of meaningful user-object relationships.

Just like the seminal work by Csikszentmihalyi & Rochberg-Halton (1981), most existing studies have looked at cherished possessions that are significant to an individual in the present (Golsteijn et al., 2012; Kleine et al., 1995; Schultz et al., 1989). In our work we adopt the approach of Myers (1985) to more deeply consider the role of cherished possessions throughout the life-narrative of individuals; encouraging retrospective and prospective thought on what was, what is and what may become a meaningful possession. We present our findings through use of the thematic analysis method to highlight central themes to participants' reasoning for cherishment. We then discuss the effectiveness of the design study activities and how the design of new products and systems stand to benefit from further considering multiple facets of identity within user-object relationships.

RELATED WORK
The topic of this paper is interdisciplinary; relating to literature from psychology, sociology, material culture, consumer research and HCI that addresses the links between possessions and self-identity (Belk, 1988; Csikszentmihalyi & Rochberg-Halton, 1981; Kleine et al., 1995; Schultz et al., 1989), the context of this identity within a life-narrative (Belk, 1988; McAdams, 2001; Myers, 1985), the memories brought to mind by possessions (Golsteijn et al., 2012; Kirk & Sellen, 2010; Petrelli et al., 2008; Petrelli et al., 2009) and the role of object format in emotional attachment (Denegri-Knott et

al., 2012; Golsteijn et al., 2012; Odom et al., 2014; Petrelli & Whittaker, 2010).

Emotional Attachment to Objects
The relationship between people and their possessions can be considered meaningful for a range of reasons. In their study, Csikszentmihalyi & Rochberg-Halton (1981) formulated categories for the reasoning for objects to be considered meaningful. These range from 'object-based meanings' including memories brought to mind, significant associations to beliefs or values, experiences enabled by the object, favourable styling of the object, utilitarian value and 'person-based meanings' with ties to the self, family, friends or associates. Possessions can bring about a rich range of emotions from their links to people, places, experiences or life periods conjured in the memories of the individual. They can provide pleasure through habitual use or grant self-expressive opportunities (Schifferstein & Zwartkruis-Pelgrim, 2008).

Cherished Possessions and Self-Identity
The significance of certain material possessions in the formation and development of the self-identity has been addressed in a number of studies (Belk, 1988; Csikzentmihalyi & Rochberg-Halton 1981; Schultz et al., 1989). Belk (1988) builds upon the idea of the 'extended self' in which an individual's sense of self extends beyond what is 'me' to what is 'mine', including 'my belongings', 'my friends' and 'my family'. Within this framework, the relevance of possessions to one's own identity can be arranged in order from 'self' to 'not self', decreasing in authenticity to one's 'true self'. This has been criticised for neglecting the importance of relation to others in self-conception (Kleine et al., 1995). More recent work has proposed a multi-dimensional framework in which material possessions that are considered 'not me' can be equally significant to those that are considered 'me' in their contribution to the development of self-identity in instances of reflecting self-change, where a possession is no longer 'me', representing a period in life from which a person wishes to disconnect (Kleine et al., 1995).

This development of the self has been characterised by two conventional themes; 'affiliation' versus 'autonomy' seeking and 'temporal change' versus 'stability management' (Kleine et al., 1995). The first of these themes suggests people are motivated to *"establish and maintain a personal and unique identity, distinct from that of others"* (autonomy seeking) while at the same time *"maintain interpersonal connections that also define the self"* (affiliation seeking) (Kleine et al., 1995, p. 328). Possessions that bear strong emotional attachment should therefore reflect affiliation or autonomy seeking qualities to be considered relevant to one's identity. The second of these themes relates more so to the life-narratives of individuals. Possessions play a role in this development of the self as tools for self-conception and defining 'me' or as enablers for development, bridging the transition from one's present-self towards their ideal, anticipated-self (McAdams, 2001).

Facets of the Self-Identity
Several studies have looked at the topic of self-identity through its division into multiple identity facets (Csikszentmihalyi & Rochberg-Halton, 1981; Gubrium & Holstein, 2000; Tracy & Trethewey, 2005). Gubrium & Holstein (2000) discuss the 'personal self', determined by individual characteristics, and 'social self', determined by memberships in various social groups or categories, as interrelated but distinct identities of an individual that each informs the other. More recently, the idea of an 'organisational self', determined by an individual's place within a working environment, has been explored (Tian & Belk, 2005; Tracy & Trethewey, 2005). This 'organisational self' is again interrelated to other facets of one's identity, influencing their personal and social identities to align with the characteristics of their profession (e.g. nurses identifying themselves with caring for others). Tian & Belk (2005) discuss the ways in which individuals use possessions to privatise their workspace and aid in switching between conflicting facets of the self; 'self-as-worker' and 'self-as-family-member'.

These interrelated yet divergent or even conflicting facets of an individual's self-identity closely align to the previously discussed affiliation and autonomy seeking motivations that universally direct on-going identity development. Possessions can fulfil 'autonomy seeking' motivations spawned from the 'personal self' when they provide evidence of individual accomplishments or 'affiliation seeking' motivations spawned from the 'social self' when they reflect connection with others.

Emotional Attachment in the Digital Age
With more of our lives moving to the digital realm, work from multiple disciplines has begun to look at the relationship between people and their digital possessions. Recent studies have found the value of digital possessions to be similar to their material counterpart in that they express individuality (Bryant & Akerman, 2009), mark a social identity (Martin, 2008), connect us to our past (Kirk & Sellen, 2010; Watkins & Molesworth, 2012) and remind us of loved ones (Kirk & Sellen, 2010; Watkins & Molesworth, 2012). In many cases this work is done in a similar light to those looking at cherished material possessions, with several directly comparing the influence of the object format on the formation of emotional significance (Golsteijn et al., 2012; Petrelli & Whittaker, 2010). The findings of these studies suggest that people often do not value digital objects as highly as their physical counterpart. The role of object format on the emotional significance of digital possessions has since become a key area of exploration in HCI with studies identifying some of the challenges facing digital possessions such as ownership, singularity and uniqueness (Denegri-Knott et al., 2012; Odom et al., 2014). Similar studies have argued that the barriers to value formation in digital possessions are caused by current technical limitations rather than their immaterial nature (Watkins & Molesworth, 2012).

Design for Emotional Attachment
Several case studies have detailed the design of novel objects with an emphasis on emotional significance. Whilst varied in their execution, each of these designs seek to establish emotional significance with users through engaging interactions. Weiss et al. (2009) evaluate

Figure 1. From left to right, five 'active' objects: mug, tea towel, key ring, pen, lamp and five 'contemplative' objects: plant, photo frame, sculpture, visual art and plush toy.

children's first time reactions to the expressive behaviour of the robotic pet, AIBO. In her paper, Lacey (2009) presents a range of emotive ceramic cup and saucer designs that play on the ideas of engagement and empathy within the user experience. Van Krieken et al. (2012) propose a 'sneaky kettle' that reveals signs of animacy and personality by rotating when nobody is looking. They propose a number of product qualities for promoting emotional durability including 'adapt to the user's identity', acknowledging the importance of self-expression and group affiliation in the formation of emotional attachment (Kleine et al., 1995; Schultz et al., 1989; Wallendorf & Arnould, 1988).

Whilst their focus on advancing the *design* of objects to kindle emotional significance is an objective we share, these studies largely omit the wealth of literature stemming from material culture, sociology and consumer research that emphasise the role of self-identity in meaningful user-object relationships. We see opportunity for exploring how this relationship between self-identity and emotional attachment to possessions can provide insights for the design of objects that promote emotional significance.

METHODOLOGY

As the topic of emotional significance in user-object relationships is interdisciplinary, the methods utilised to study this bond have ranged broadly from Q-Methodology (Kleine et al., 1995), questionnaires (Dyl & Wapner, 1996; Schifferstein & Zwartkruis-Pelgrim, 2008; Schultz et al., 1989; Weiss et al., 2009), interviews (Denegri-Knott et al., 2012; Dyl & Wapner, 1996; Kirk & Sellen, 2010; Lacey 2009), focus groups (Golsteijn et al., 2012; Wallendorf & Arnould, 1988) and non-verbal self-report instruments such as PrEmo (Desmet, 2005). Our methodological approach was inspired by the cultural probe method first introduced by Gaver et al. (1999), following its design-centric use of aesthetic and unconventional tools for gathering data about people's lives, values and thoughts. This led us to create two design-centric activities we refer to as *object interventions* and *identity timelines* that specifically target the phenomena we wish to address.

Departing from the cultural probe method, we involved participants in the interpretation of study materials through follow up interviews and in turn used these articulated reflections of participants to elaborate on the relationships

between design, object and self-identity through analytic methods much like Crabtree et al. (2003).

Participants

A total of ten people participated in the study and were recruited from the broader social connections of the researchers. To give an indication of the variation of cherished possessions across life stages, participants were selected from a broad range of age between 18 and 66 years old, detailed in Table 1. Participants came from a diverse range of professions and had no prior knowledge of the study.

Participant (Px)	Gender (F/M)	Age (yo)	Participant (Px)	Gender (F/M)	Age (yo)
P1	Female	53	P6	Male	28
P2	Female	52	P7	Female	36
P3	Male	55	P8	Female	66
P4	Female	35	P9	Female	18
P5	Male	24	P10	Male	19

Table 1. Participant number, gender and age.

Design Study Kit

In the following section we detail the devised activities and materials that formed the design kit used for our study.

Object Interventions

The first activity, described as *object interventions*, involved a range of five objects used in day-to-day activities (a mug, pen, tea towel, key ring and lamp) and five objects used for decoration or contemplation (a sculpture, photo frame, plant, visual art and plush toy) shown in Figure 1 that were presented to participants in their homes. Participants were asked to select three functioning objects and three decorative objects that fit within object categories that are used or seen in their normal routines. They were then asked to substitute their existing possessions from these categories with the objects presented (i.e. replace an existing mug with the mug presented) for a period of two weeks. The objects that were replaced were stored away by the researchers and their replacements were placed in their vacant locations. At the end of the two-week period, participants were asked to rate each of their original possessions and the selected substitute possessions on a scale from 'me' to 'not me' and 'strong emotional attachment' to 'no emotional

attachment'. The purpose of this exercise was less about gathering accurate data on the relative significance of these items, but more-so to aid participants in expressing the ill-defined differences that influence their perceptions of functionally similar objects.

Identity Timelines

The second part of the design study kit involved three *identity timelines* (see Figure 2), each to be filled in by participants with their most cherished possessions from the day they were born to what they cherish now and to what they think they may cherish in the future. Whilst the inclusion of retrospective and prospective thought on what was and what may become a meaningful possession cannot be deemed accurate measures of the significance of possessions during these alternate periods in time (McAdams, 2001), they may provide insight into people's current perceptions of both past and anticipated future selves within a life narrative (Kleine et al., 1995).

Using existing frameworks of identity facets (Gubrium & Holstein, 2000; Tian & Belk, 2005; Tracy & Trethewey, 2005), we categorised the identity under three key areas; personal, social and organisational to allow participants to frame the value ascribed to cherished possessions within their self-reported identity.

- Personal Identity – Their individual interests, values, behaviours and tastes.

- Social Identity – Their interpersonal relationships to another or group of others.

- Organisational Identity – Their values, personality, goals and behaviours within a working environment.

Brief descriptions of each identity category were accompanied by an image to evoke a richer, subjective interpretation of the task beyond the semantics of the wording used. A short list of example possessions was also provided to convey the breadth of items to consider. We wanted participants to think freely of items beyond their material objects such as digital objects (emails, a social media profile) and intangible items (a tattoo, bank account or award for excellence) that may still be considered significant to their identity. The identity timelines were left with participants to complete over a two-week period. At the end of this period, participants were given the opportunity to add, remove or relocate any possessions listed on the timelines before submitting their responses.
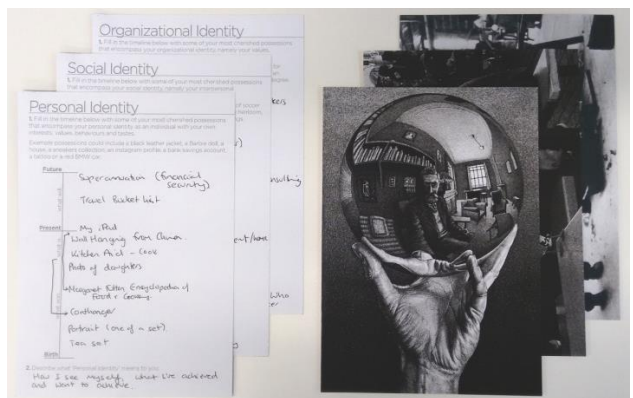

Figure 2. Identity timeline cards front and back.

Interviews

At the end of the two-week study period, a concluding semi-structured interview was conducted with each participant to discuss and evaluate the ratings given to the original and substitute objects and the possessions listed on their identity timelines. As remuneration, participants were given the option to keep any of the everyday objects that they had adopted as part of the study.

Data Collection & Analysis

Collected data included completed *identity timelines* with written descriptions of each cherished possession, photos of each participant's positional ratings of the original and substitute objects involved in the *object interventions* (see Figure 3) and audio recordings captured during the concluding interview sessions.

All interviews were transcribed and coded using the inductive thematic analysis procedure outlined by Braun & Clarke (2006). The data were thoughtfully read with segments considered meaningful to the research topic identified and then grouped in analytic categories. Interview content was coded using the set of themes and sub-themes created in the thematic analysis. A second coder was used to establish the coherence of the three key themes with a high level of interrater reliability (κ = 0.9211). Household objects included in the two-week *object interventions* activity were analysed from the positional ratings provided by participants.
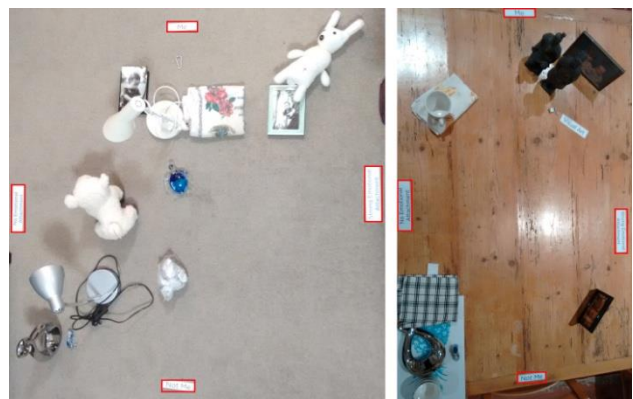

Figure 3. Two examples of participants' (P2 and P4) positional ratings of objects from 'no emotional attachment' (left label) to 'strong emotional attachment' (right label) and 'me' (top label) to 'not me' (bottom label).

FINDINGS

In this section we present our findings from the design study conducted in the homes of ten participants. First, we present the results of the *identity timelines* in relation to the three pre-defined identity facets - personal, social and organisational - to reveal the varying reasons for cherishing possessions within these differing contexts. Second, we detail the findings of the *object interventions* including the choices of participants and the reasoning behind the comparative ratings given to original and substitute objects. Finally, we present our general findings through the three key themes created in our thematic analysis of the interviews discussing the experiences of participants with both prior mentioned activities.

Identity Timelines

The ten participants listed a total of 235 cherished possessions within their *identity timelines*. Listed possessions included 181 physical objects (e.g. clothing, furniture, jewellery, vehicle, trophy, certificate), 25 digital objects (e.g. social media account, podcasts, email, digital photos) and 29 hybrid objects (Kirk & Sellen, 2010) (e.g. laptop, phone, camera, gaming console, tablet). Despite stimulus examples being provided of digital possessions, the large majority of possessions listed by participants were physical. This low representation of digital objects among possessions listed by participants as cherished is consistent with similar studies (Golsteijn et al., 2012; Petrelli et al., 2009; Petrelli & Whittaker, 2010). Physical, digital and hybrid objects were fairly consistent in their representation amongst the three identity facets.

Personal Identity

Cherished possessions listed under personal identity often contained vivid descriptions of the possessions themselves and the memories they bring to mind. For actively used possessions, meaning often stemmed from the possession's characteristics: *"I remember it because of the pleats [...] I was mesmerised by these pleats, I thought they were the hottest thing"* [P8, skirt] whilst other possessions were retrospectively valued for their association to positive past experiences: *"it's more a memento from my time in China. That's what's important"* [P1, wall hanging].

Social Identity

Possessions within the social identity category were often valued for their associations to others or a group of others: *"they remind me of all the snow trips I've been on with [dad & brother] [...] it just reminded me of family winter holidays"* [P9, skis]. In other instances, possessions represented a sense of membership and belonging to a certain group: *"the shorts had this sort of trim down the side of them that none of the other crews were allowed to have so that was significant and said you were a member of that particular crew"* [P3, rowing outfit].

Organisational Identity

Possessions attributed to a participant's organisational identity were often associated to feelings of pride in a personal accomplishment. These possessions could be physical representations of the accomplishment: *"it looks nice. It's something to show off your hard work"* [P6, framed university degree] or simply the feat itself, devoid of physicality: *"that was a great personal achievement of mine, I think it's helped me have a foundation of certain values and behaviours"* [P7, university degree].

Division of identity facets

Many participants listed possessions that had several reasons for their significance, often spanning across the boundaries set by the activity. There was often a blurred distinction between someone's individuality, the unique set of characteristics that define their autonomy, and their interpersonal affiliations. Participant's affiliations were in some cases seen as distinguishing features of their personal identity, particularly in family ties: *"inside I have a picture of my two granddads who have both passed away so in that regard it's very special as well"* [P9, locket]. Other possessions did not blur the lines between identity facets

in their meaning, but would bear significance for multiple reasons: *"we'd go riding together so that was a social thing but I also liked the fact that it was my possession. It was a nice bike and I used to clean it all the time"* [P6, bicycle]. In this instance, the cherished possession fulfils both 'affiliation-seeking' and 'autonomy-seeking' motivations by stressing signs of connectedness with a friend whilst simultaneously emphasising individuality through the ownership of a particular bike.

Object Interventions

It was difficult to predict the results of asking participants to replace a range of common household items with a set of similar objects for a two-week period. Our aims were therefore largely explorative, looking at how people rationalise their differing perceptions between similarly-functioning objects.

Object selection

The most commonly chosen object was the mug (9 out of 10 participants) and the least commonly chosen was the plant (1 out of 10 participants) with all others chosen by 3 to 7 participants. This result could be influenced by a multitude of factors. Participants that did not own an object prior to the study that fit within a certain object category had the presented object removed from their available selection. The thought process described by participants also varied with some selecting objects that would cause the least amount of inconvenience whilst others sought those that they believed would be the most disruptive over the two-week period.

Object ratings

At the end of the two-week study period, participants were asked to position each of the six original and six substitute objects within an area to indicate the degree of 'me-ness' and emotional attachment attributed to each of the objects. As may be expected, objects that were owned by participants prior to the study greatly outperformed those that were introduced for the two-week period. Still, the purpose of the interventions were not to compare related objects on even grounds, but rather to provide a point of comparison to enrich participant responses.

The act of substituting household objects with similarly functioning objects led participants to think more deeply about the items that are so heavily integrated into their daily lives: *"That [substitute] is a better mug but it is completely meaningless to me and it irritated me [...] because it wasn't this [original] mug. It wasn't something that every night I would reach for automatically"* [P2]. Some object substitutions left participants feeling indifferent: *"They're the same. They're just tea towels"* [P5] whilst others had dramatic variance between the introduced object: *"I don't like it. Wouldn't have it in my home"* and their own: *"when I look at this painting, I remember all of these different things. I remember the physical place, [...] I remember a great holiday"* [P2, visual art]. The physical attributes of the substitute objects often had a significant impact on their ratings amongst participants. They were often positively received when their physical attributes were associated to existing possessions: *"I have a similar one so it's already something that I'm appeal to"* [P9, plush toy] or people:

Theme	Description	Sub Theme	Description
Selfhood	The set of behavioural or personal characteristics that define an individual.	Attributes	Attributes, characteristics, qualities or function of the possession.
		Associations	Associations, ties or links to ideas, aspects or activities external to the possession.
		Values	Principles or standards of behaviour, one's judgment of what is important in life.
Life Story	The series of events making up a person's life.	Person	A person or people other than the participant mentioned.
		Non-person	No person or people other than the participant mentioned.
Selfhood & Life Story	Reference to both selfhood and life story.	Combination	Both selfhood and life story positively contributing to the value of the possession.
		Contrast	Selfhood and life story conversely contributing to and detracting from the value of the possession.
		Comparison	Comparing or weighing the importance of selfhood and life story in their contribution to the value of the possession.

Table 2. Thematic Analysis themes, sub-themes and descriptions.

"it made me think of my mother [...] orange has always reminded me of my mother" [P8, visual art].

Overall, participants expressed negative or apathetic sentiment when discussing the introduced objects: *"There is no attachment; there is no meaning to them. There's nothing intimate about them"* [P8] and positive or enthusiastic sentiment in regards to their prior objects: *"I've come to really like it and identify it with me at home"* [P7, mug]. With only minor differences in the functionality of the original and substitute objects, why might there be such a dramatic difference in the way they are perceived?

Some participant's ratings were impacted by their perceptions of ownership over the objects: *"it's not my mug. I knew it [substitute] wasn't my mug whereas that one [original] I know is mine"* [P9]. Objects were often rated within the 'me' to 'not me' scale for their relevance to participant's tastes: *"I wouldn't normally have that style"* [P3, lamp], *"it's the colours I like"* [P7, vase].

The emotional attachment felt towards an object was often dictated by the memories it evoked: *"that mug reminds me of an enormous amount of stuff for a period of my life. All sorts of things, travel things, a completely different culture"* [P2] or lack thereof: *"there's no history behind it [...] this came from nowhere"* [P4, plush toy]. This attachment could stem from its origin, containing memories of an experience: *"what gave it value was how it was given, how I received it"* [P8, key ring] or place: *"it has a stronger emotional attachment for me because I got it in Singapore"* [P3, sculpture]. Objects that were considered 'not me but strong emotional attachment' often did not reflect the tastes of the owner but had strong associations to a friend or family member through the act of gifting, outweighing their discontentment with its physical characteristics: *"I would never ever choose to display it but because [close friend] chose to give it to me and it was so heartfelt [...] I cannot pull myself to put it away"* [P2, figurine]. Conversely, objects that were considered 'me' but devoid of emotional attachment had strong associations to the personal attributes of the owner but no significant history: *"they're straight forward, they're simple to use, [...] they're practical which is more my end of it"* [P3, pen].

Interviews

The three key themes and eight sub themes (see Table 2) discerned in the thematic analysis of the participant interviews were the result of rigorous coding of 115 units of text arising from discussion of both the *identity timelines* and *object interventions* activities. These key themes are 'selfhood', 'life story' and 'selfhood & life story', the latter describing instances where a participant spoke in relation to both selfhood and life story within the same thought. This overlap of themes formed its own separate theme as it was deemed significant when participants referred to selfhood and life story in relation to each other.

Selfhood
Many of the assessments made by participants were derived from their personal values, beliefs, interests and preferences, all of which distinguish them as an individual. These characteristics are reflected by the objects that participants cherish, providing glimpses of a past, present or anticipated future identity.

The values of some possessions were described by their physical attributes such as colour, style, functionality or aesthetics: *"the pram is very functional; it's a very good design. People say it's the Mercedes Benz of prams"* [P4]. Others gained value from the associations formed by participants, creating links to prized aspects of their personality: *"I like dictionaries and I like the way they look and I like the way they're arranged and it appeals to my library sense of order"* [P2].

Life Story
Alternatively, the significance of possessions stems from their place within the life story of the owner. In this case, the value of the possessions derives from its relationship to a past event, life period or place. The past experience may be seen as a profound moment: *"my dad taught me how to ride the bike [...] it was one of those moments where you think your dad is holding on to you and he lets go so I still remember exactly the spot and everything"* [P4] or a period of self-development: *"that book is a representation of a transition, a massive transition, from a little country bumpkin to somebody who could hold their own and did well at school and who got into uni and who took all the opportunities"* [P2]. The recollection of significant aspects of one's life story can in itself influence the feelings assigned to possessions (Gubrium & Holstein, 2000). The

question is raised; was the possession significant at the time of its involvement within a participant's life, was it only significant retrospectively or did it gain additional significance with the passage of time? Future product-attachment studies that utilise longitudinal methods could provide a greater understanding of this relationship between on-going development of identity and shifting perceptions of possessions.

Selfhood & Life Story

In a number of cases, participants identified both selfhood and life story significance in their discussion of a possession. The reasoning for cherishing a possession often alluded to both its relevance to the values of its owner and the fond memories it is associated with: *"I had good memories of abseiling and going camping at school. I like it also because it's functional as well. It actually does something, it's not just decorative"* [P4, key ring].

In other instances responses would reflect a contrast between its value as a functioning object and the memories it cues: *"it's actually quite annoying but it reminds me of my father"* [P4, alarm clock]. In these instances the sentimental value of the possession within a participant's life story outweighs its lacklustre physicality: *"it's completely useless [...] but it just reminds me of where I started"* [P2, book].

This interplay between aspects of an individual's set of values and their memories and experiences is also weighed against one another: *"I do like the ring itself but it's more representing who gave it to me"* [P9]. This comparison shows the varying degree of significance the range of factors bear in the overall perceptions of a possession.

The separation of notions of selfhood and life story is difficult to establish and define. The life story of an individual undoubtedly influences their current perceptions of selfhood and vice versa when reconstructing distant past memories (McAdams, 2001). This is demonstrated when a participant fondly recollects past experiences of cooking with loved ones: *"a lot of my earliest memories are cooking with my grandmother"* and later describing cooking as a central aspect of their individuality: *"I love cooking [...] it is one of the defining things about me"* [P2]. Whilst this link between past social experiences and current perceptions of self-identity can be identified from the responses given by a participant discussing their collection of cookbooks, the cause and effect relationship of these two aspects of identity are not often traceable. Still, we believe possessions can provide inklings of these inseparable aspects of a person's identity.

Perceptions of Cherished Digital Objects

Several participants were reluctant to list certain digital and hybrid objects as cherished possessions: *"I hate valuing technology to that extent but my laptop basically has my life on it"* [P9], *"I didn't want to put it because there's that stigma of Facebook being your life but I think practically it forms my social identity"* [P7]. Despite their reluctance, in both cases participants refer to the large role these possessions have within their current lives. Other participants similarly described the broad significance of digital possessions in their current lives: *"they allow me to communicate with people"* [P5], *"it is such a massive part now of my social identity"* [P2, social media accounts] but their responses were devoid of reference to the characteristics of the digital object itself. This contrasted the significance of the object for several physical possessions: *"Its heavy, its solid, its silver, it's a beautifully designed [key ring]"* [P2].

DISCUSSION

In our analysis of reasoning for the emotional significance or identity relevance of objects we present the overarching themes and trends of participant responses. Whilst these findings are likely to be influenced by the small number of participants, their ages and their backgrounds, we do see value in considering these results in conjunction with the related studies that informed its structure and aims. We also acknowledge the differences in object attachment across cultures (Wallendorf & Arnould, 1988) that further undermines over-generalising our findings. In the following section we discuss the effectiveness of the devised activities and the blurred conceptual boundaries between self-developmental themes and identity facets.

Design Study Methodology

Our creation and implementation of design-centric activities created a desirable scenario where participants had much to say before even being questioned. By disrupting routine and prompting comparative evaluation, the *object intervention*s were effective in both highlighting differences in perceptions of objects and facilitating reflection on the factors that contribute to an object's emotional significance or identity relevance. The use of spatial positioning over the more commonly used numeric rating scales showed promise as a more intuitive way for participants to rate multiple items. The variances revealed in participant's values across *identity timelines* suggests the complexity and diversity that can be found within an individual, challenging more traditional methods used by designers such as the development of personas (Cooper, 1999) that may oversimplify users. We see merit in using novel design-centric methods to generate new insights and encourage future work to similarly consider design-centric approaches of gathering data.

Object Meanings

There were a number of instances where a possession mentioned by a participant was valued for multiple reasons that varied from when used and when seen. This duality existed when an object would provide a pleasant experience in its use but also contain significance in its appearance or associations that led to reflection; for example, the duality experienced in riding down a winding road and showcasing a prized motorcycle.

The notion of objects containing several, distinct meanings is not novel. In their analysis of object meanings, Csikszentmihalyi & Rochberg-Halton (1981) identified 7875 meanings within the 1694 objects involved in their study, averaging close to four meanings per object. Despite this multitude of identified meanings, they suggest that 'individuality' and 'relatedness' based motivations for valuing an object are *"dichotomous"* (Csikszentmihalyi & Rochberg-Halton, 1981, p. 113), something that our findings did not support. We found several instances of

objects being valued for both the 'individuality' and 'relatedness' they emphasise through their use, ownership and associations with examples outlined in our findings.

Physical and Digital Objects
Digital possessions that were emotionally significant to participants reflected identity-based motivations in a similar manner to their physical counterpart. Participants did however convey a sense of shame when discussing their valued digital possessions. We see this stigma of cherishing digital possessions as a notable barrier to creating emotionally significant digital objects that has been largely overlooked by the HCI community.

Several participants highlighted the importance of a sense of ownership in their reasoning for valuing or not valuing objects involved in the study. The prevalence of cloud-based storage of digital media can diminish feelings of ownership (Odom et al., 2014). Whilst the *'placeless'* nature of digital objects offers users the convenience of access almost anywhere, it can also act as a barrier to the development of emotional significance. Our findings emphasise the varying reasons for cherishing possessions within differing contexts. A tie would not be suitable at the beach, just as a pair of board shorts would not suit an office environment. These objects are designed for, and associated with, the identity that people portray in the contexts in which they are used and seen. This poses a challenge for the design of *'placeless'* digital objects to be either constrained within, or adapt to, varied contexts that bring about particular aspects of one's identity.

Insights for Design
Self-identity has a prevalent role in the establishment of meaningful user-object relationships (Csikszentmihalyi & Rochberg-Halton, 1981; Kleine et al., 1995; Schultz et al., 1989). Design can promote emotional attachment by addressing identity-based motivations of developing signs of individuality, stressing signs of relatedness or most effectively by fulfilling both seemingly conflicting motivations (Bryant & Akerman, 2009; Schifferstein & Zwartkruis-Pelgrim, 2008). This closely aligns with Brewer's established social psychology model of optimal distinctiveness in which social identity ties are strongest when they *"simultaneously provide for a sense of belonging and a sense of distinctiveness"* (Brewer, 1991, p. 475). Our findings support this conclusion, where cherished possessions often contain multiple reasons for their significance with value stemming from both the personal and social self, autonomy and affiliation-seeking motivations, or a combination of past, present and anticipated future identities. An example from our study is a locket owned by P9 containing photos of her two grandfathers. The locket itself stresses individuality through its personalised contents whilst simultaneously providing a sign of connectedness with her family. We see this layering of meaning as a central component of emotionally significant objects that should be considered in efforts to design for emotional attachment.

One of the driving forces for cherishing a possession found in the responses of our study and those of previous studies were the associations the possession held to significant experiences, people or places within their life story. Much

like the previously described locket, we argue that designers can encourage the formation of specific memory and experience-based associations with new products and systems by implementing custom design practices such as personalization and customization. The effectiveness of this approach has limitations as people often do not consciously create significant associations with objects but rather develop them over time through a shared personal history (Kleine & Baker, 2004).

Whilst unique life story associations often play a central role in meaningful user-object relationships, our findings also emphasise the importance of identity relevance in contributing to the overall emotional significance of a possession. Many items were seen to align with aspects of selfhood such as the values, behaviour and tastes of the individual. This alignment represents association between features of the object and aspects of the owner's identity. We encourage designers to utilise association-based design strategies such as product metaphors (Hekkert & Cila, 2015) to align new products and systems with the values users portray in their context of use.

The results of our study also highlight some of the challenges involved in designing for emotional attachment. Most notably, each individual's self-identity and life story represents unique interests, values, behaviours, experiences and tastes that are further muddled by the variances that exist between facets of identity within an individual. In future work, we intend to build upon our findings by applying these insights to the design of new products targeted towards the unique identities and life-narratives of individuals to further reveal the potential for design to promote meaningful user-object relationships.

CONCLUSIONS
The design study presented in this paper explored people's relationships with cherished and newly introduced possessions. Insights were made into the significance of possessions in developing, reinforcing and redefining the various facets of one's past, present and anticipated future identity. The study revealed that people often assign emotional significance to possessions for a multitude of meanings, often relating to their personal values and life experiences. These findings were used to discuss how the design of new products and systems can promote the formation of emotional significance by consolidating a multitude of meanings and facilitating associations between object and significant aspects of one's selfhood or life story. Links between the ongoing developments of identity, the recollection and reconstruction of a life story and the role of cherished possessions highlight the complex nature of designing for emotional attachment. The significance of cherished objects validates the merit in designing for the formation, continuation and enrichment of meaningful user-object relationships.

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